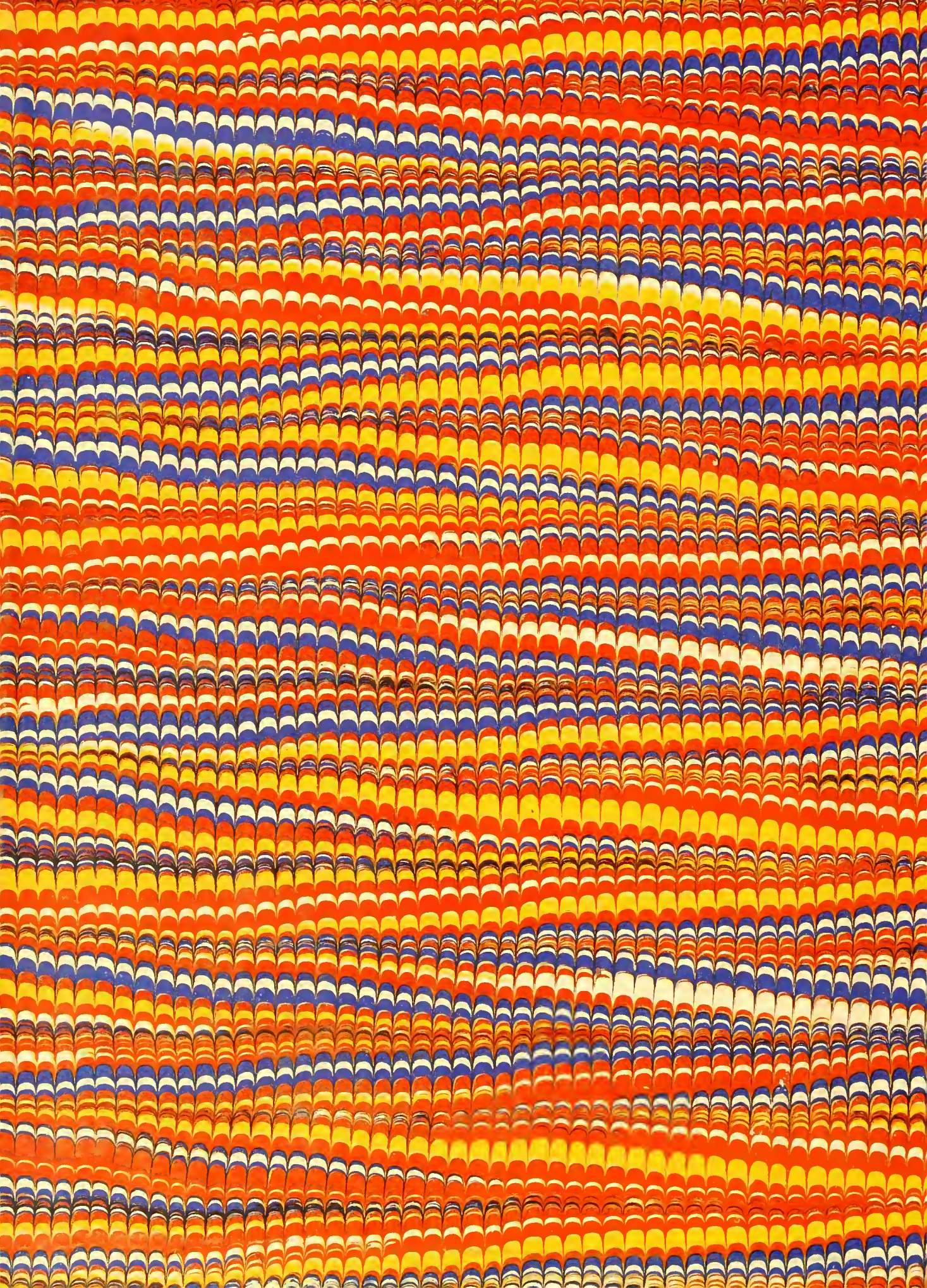

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FASCICULUS I. PAGURIDES.

BY

A. ALCOCK, M.B., LL.D., F.R.S., C.I.E.

INDIAN MEDICAL SERVICE; FELLOW OF THE LINNEAN SOCIETY, CORRESPONDING MEMBER OF THE ZOOLOGICAL SOCIETY, HONORARY MEMBER OF THE NETHERLAND ZOOLOGICAL SOCIETY, AND OF THE CALIFORNIAN ACADEMY OF SCIENCES; SUPERINTENDENT OF THE INDIAN MUSEUM AND PROFESSOR OF ZOOLOGY AND COMPARATIVE ANATOMY IN THE MEDICAL COLLEGE, CALCUTTA.

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INTRODUCTION.

This volume is the Second, but an independent, Part of a monograph of the Decapod Crustacea of that part of the Oriental Region that lies within the political boundaries of British India: it treats exclusively of the Section *Paguridea* of the Sub-order *Anomala* or *Anomura*.

In my *Catalogue of Deep-Sea Crustacea in the Indian Museum*, I have already (p. 204) explained that the Sub-order Anomala of this series of catalogues is that of De Haan and Boas (= *Anomoura Schizostomi* of Stimpson), and have (pp. 206—208) sufficiently defined the sub-order; and in the Introduction to the series (Part I. Fasciculus i, pp. 13—15) the scheme of classification of the Decapoda here adopted has been re-stated and tabulated.

It is enough, therefore, for my present purpose, to repeat that the Anomala or Anomura are divided by Boas into three very natural groups, namely, *Paguroidæ*, *Galatheidæ*, and *Hippidæ*.

The present fascicle deals with the first of these—the *Paguroidæ*, or *Paguridea*, a group which includes four families, namely, *Pylochelidæ*, *Paguridæ*, *Cœnobitidæ*, and *Lithodidæ*; but as the Indian Lithodidæ are entirely deep-sea forms, and have already been described in the *Catalogue of Deep-Sea Crustacea*, they will not be further noticed in the systematic part.

General Observations on the Paguridea.

1. *The Form of the Body.*

In the *Lithodidæ* the body is superficially crab-like. In the other three families the carapace does not cover the last thoracic segment, which, as usual, is independent and freely movable; often also it fails to cover the ophthalmic somite: it is commonly elongate, retracted anteriorly, where its sidewalls are deep and nearly perpendicular; and more or less expanded posteriorly, where its sidewalls *may* be abrupt, but more often form an open curve with the dorsal surface: the dorsal portion of the region in front of the well-marked cervical groove is its most strongly calcified part, the lateral and especially the postero-lateral regions being often merely coriaceous or even membranaceous.

The condition of the thoracic sterna varies greatly; sometimes they are broad and almost crab-like, sometimes they are almost linear, occasionally their development is not quite bilaterally symmetrical.

The abdomen also varies considerably. In the majority of the suborder it is less well developed than the cephalothorax, and is soft—the terga being insufficiently developed to cover its surface—asymmetrical, and coiled in adaptation to the spiral curve of the gastropod shell which the animal commonly uses as a portable habitation. In a few cases (*Pylochelidæ*) it is larger than the cephalothorax, perfectly straight and symmetrical, and has all its terga well formed and efficient. In certain forms, that protect themselves with something other than a rigid shell, the abdomen, while remaining soft, becomes merely flexed; and there are a few forms that are independent of any adventitious protection and have a more or less crab-like abdomen. Occasionally the abdomen is rudimentary. Regarded in a general way the Pagurine abdomen is no longer of any use in locomotion, but has become an envelope for certain important viscera (liver and reproductive glands).

2. *The Appendages.*

The eyestalks are well formed and mobile, and it is rare, even among hermit-crabs that live in the abysses to which no sunlight can penetrate, to find the eyes defective. The coxal joint of the eyestalk is usually surmounted, dorsally, by a prominent platelet or spine—the "ophthalmic scale."

The antennular peduncles are carried folded, when pulled out they, as a rule, considerably exceed the antennal peduncles in length: their first joint is dilated at base: their flagella are usually short, and the upper one is much longer than the lower.

The joints of the antennal peduncle are 5 in number. The 2nd joint often has its outer distal angle spiniform, and usually also carries an acicle—the homologue of the large antennal scale of *Nephrops*—which is generally mobile and often of considerable length.

The mouth-parts in the main resemble those of *Nephrops* (see Fasc. I. pl. A, fig. I), but in the 1st maxillæ the endopodite (palp) is, oftener than not, non-flagellate; in the 2nd maxillæ the scaphognathite is posteriorly more or less truncated; in the first maxillipeds the exopodite is often non-flagellate; and there are no epipodites to the 1st and 2nd maxillipeds, and no podobranchiæ on the 2nd and 3rd maxillipeds: moreover, the flagella of the exopodites of the maxillipeds are bent sharply inwards as in crabs. The coxopodites of the 3rd (external) maxillipeds may be in contact, or may be separated by a broad sternum—a point of primary importance in the classification of the group, as Bouvier has insisted.

The chelipeds are generally much stouter than the 2nd and 3rd pairs of legs: sometimes they are quite equal and symmetrical, but much oftener one is very much larger than the other. The wrist and hand may lie in the same plane with the merus, in which case the fingers move more or less vertically; or they may be twisted so that their true outer surface looks upwards, and then the fingers move more or less horizontally. The finger-tips may be calcareous, or may be more or less edged with chitin. The proportions of the chelipeds, the set of the hands, and the condition of the finger-tips furnish characters that are important in classification. Occasionally the hands, or one of them, are modified to form a door (operculum) to the mouth of the shell or tube in which the animal lives.

The 2nd and 3rd legs (only in the *Lithodidæ* the 4th pair also) are the organs of locomotion, and are consequently long and stout. Each, like the chelipeds, consists of 6 joints, the basis and ischium being fused. They may either equal or may considerably exceed the chelipeds in length, and they may be symmetrical, or those of one side (usually the right) may be a little the longer. Very often the propodite and dactylus of the third left leg—these being parts that can be made use of by the animal to close its shell; or, in other words, parts that are of signal importance to the animal in adapting itself to the environment—furnish characters of obvious *specific* value in classification.

The 4th and 5th legs are, in all typical Pagurines, very much reduced in size, are useless for locomotion, and are used as grapnels to hold the shell, or other adventitious tenement, fast. To this end the 5th pair are almost always chelate, and the 4th pair subchelate (occasionally even chelate), and in both pairs the distal end of the propodite (and often of the dactylus also) has on its outer surface a well-defined patch of imbricating corneous granules that recalls in some sort the sole of a house lizard's foot. Only in *Birgus* and the *Lithodidæ* do the 4th and 5th legs depart from this typical form. In these the 5th legs are little better than rudiments, which are carried inside the gill-chamber; while as to the 4th pair, in Birgus they end in rasp-like chelæ of considerable size, and in the *Lithodidæ* they are ambulatory legs like the two pairs in front of them.

Occasionally in the male the coxæ of the 5th pair of legs (or one of them) are produced, either in themselves or as to the vas deferens that perforates them, to form an intromittent tube often of almost fantastic shape. Characters of classificatory value are thus afforded by the coxæ of the 5th pair of legs.

The appendages of the abdomen vary greatly, and very rarely can be of any use in locomotion. Except in the *Lithodidæ* the caudal swimmerets ("uropods") are invariably present, and are commonly used as grapnels, being

rigid and often hook-like, and having a large patch of imbricating corneous granules—possibly acting together as a sucker—on the dorsal surface.

Sometimes the uropods are the only abdominal appendages present, but always in the female, and usually in the male also, there are 3 or 4 (somites 2-4, or 2-5) unpaired appendages on the left side; only in the unique *Paguropsis* is their position indifferently either left or right. These unpaired appendages are large in the female, where they are used for carrying the eggs; but are small and uniramous, or have one ramus rudimentary, in the male, where they are of no functional importance. Sometimes, in addition to the unpaired appendages, the 1st, or 1st and 2nd, abdominal somites of the male, and the 1st of the female are furnished with uniramous *paired* appendages modified for sexual purposes. Very rarely (only in the *Pylochelidæ*) do *paired* appendages exist on *all* the abdominal somites from the 1st to the 6th.

As regards the uropods and telson, they *may* be quite symmetrical, but are usually much more developed on the left side than on the right.

3. *Organs of Respiration.*

The gills are variable both in form and number, but are never more than 14, or less than 10, on either side. Five pairs of arthrobranchiæ are always present, namely, a pair on each of the thoracic appendages from the external maxillipeds to the 4th pair of legs (somites IX—XIII): in addition, each of the last four thoracic somites may carry a pleurobranch; or the pleurobranch may be absent from the last somite only; or may be present on the penultimate somite only; or all the pleurobranchiæ may be absent.

The gill-plumes may be phyllobranchiæ (two series of leaves, one on either side of a shaft), or trichobranchiæ (four series of filaments, two on either side of a shaft), or may be intermediate in character. Most often they are phyllobranchiæ.

In the land-hermits the gills are of quite subsidiary importance, and respiration is in a large measure effected either by the wall of the gill chamber or by hypertrophied portions of the integument of the abdomen.

4. *Reproduction.*

The reproductive organs are lodged in the abdomen and are to a certain extent affected by its lop-sided character. Their ducts perforate, in the male the coxæ of the 5th pair of thoracic legs, in the female the coxæ of the antepenultimate pair.

The ova are impregnated internally, probably—when such mechanisms are present—by the paired anterior abdominal appendages of the male, or

by the modified coxopodites of the 5th pair of thoracic legs of the male, or by the protruded vas deferens itself; but more often no special means of fertilization are discoverable.

The extruded ova, which are usually small and numerous, but (in some of the sublittoral species) may be few and large, are attached to the setose biramous abdominal appendages of the mother. In a few hermit-crabs there grows out from the side of the abdomen of the female a fleshy or membranaceous flap that acts as a brood-pouch: this, like the abdominal appendages, is placed on the left side, except in the unique *Paguropsis*, where it may be on either side.

The larva is hatched as a bilaterally-symmetrical zoæa, not unlike the zoæa of some of the macrurous Decapods in general form. It has a rostrated carapace, and an elongate and normally-extended, segmented abdomen, and all the appendages from the eyes to the 3rd maxillipeds are represented, the first two pairs of maxillipeds being the principal organs of locomotion.*

In the course of successive moults the remaining thoracic appendages appear and, ultimately, five pairs of abdominal appendages (somites 2—6) also, the larva, which is now known as a *Glaucothoë*, being still bilaterally symmetrical, except that the cheliped of one side may be enlarged.

If, as is generally the case, the young hermit-crab now takes up its abode in the shell of a gastropod mollusk, the appendages of one side of the abdomen—usually the right—become atrophied.

For the details of the post-embryonic development of Paguridæ, the following papers should be consulted:—

Philippi:—Zoë von Pagurus: *Archiv fur Naturges.* VI. 1840, p. 184, pl. iii, fig. 7, 8.

Rathke: Zur Entwickelungs. der Decapoden: *Archiv f. Nat.* VI. 1840, p. 241. Trans. in *Ann. Mag. Nat. Hist.* VI. 1840, p. 263.

Spence Bate: Carcinological Gleanings, No. IV.: *Ann. Mag. Nat. Hist.* (4) II. 1868, p. 114, pl. ix, fig. 2.

Boas: Vid. Selsk. Skr., 6 Raekke, Nat. og Math. Afd. I. 2. 1880, p. 197

Faxon: Mem. Mus. Comp. Zool. Harvard, IX. No. 1, 1882, pl. xii, fig. 20-30, pl. xiii, fig. 1—9.

Sars: Decapod. Forvandlinger: *Arch. f. Math. o Nat.* XIII. 1890, pp. 135—161, pl. i—iii.

Bouvier: Ann. Sci. Nat. Zool. (7) XII. 1891, pp. 65—82 (*ubi lit. plen.*)

Borradaile: in Willey's Zoological Results, Part V, 1900, pp. 585 590.

5. *Habits and Mode of Life.*

There is no group, even of Crustacea, that outdoes the Paguridea in combining uniformity of structure with diversity of habit. Morphologically,

*This summarised statement applies only to the Paguroids; in the *Lithodidæ*, according to Boas and G. O. Sars, the larva leaves the egg in a still more advanced stage.

the difference between *Birgus* and *Parapagurus* is extremely slight, yet the one is (except in its larval stages) a land animal, while the other spends its life in the abysses of the ocean.

The typical Paguroid lives in a cast-off Gastropod shell, for the protection of its soft abdomen Shells with a dextral twist being the rule, and those with a sinistral twist being the exception, it follows that a right-hand shell is practically always used and moulds the abdomen, giving it a permanent curl to the right and causing (by pressure) an atrophy of its appendages of the right side.

This right-sided asymmetry is stamped upon the group; for not only does it, according to Milne Edwards and Bouvier, persist in those rare abnormal individuals that adapt themselves to a sinistral shell; but also it is equally manifest in at least the females of certain forms (such as the *Lithodidæ*, *Cancellus*, *Tylaspis*, *Os raconotus*) that are either quite free throughout life, or at any rate do not live in a spiral shell.

The explanation of the matter is not quite so simple as it looks, and those (if there be any) who are inclined to regard it as a case of inheritance of an acquired character, have still to explain how it is that in *Paguropsis* (a hermit-crab, closely related to *Paguristes* and sprung from asymmetrical ancestors, which does not use a shell and has regained a secondary symmetry) the abdominal appendages are atrophied in some individuals on the right side and in other individuals on the left.

As the hermit-crab grows, it, as a rule, shifts periodically into a larger habitation; but where, as in the depths of the ocean, the supply of suitable shells is limited, other adaptations to growth are possible.

It is very common for the shell inhabited by a hermit-crab to also accommodate out-door tenants, such as zoophytes, cirripedes, sponges, tubicolous annelids, etc. Sometimes, no doubt, the association is merely accidental; but often it is a true commensalism, or definite alliance for mutual benefit, which may even go so far as to lead to mutual adaptations of structure.

Perhaps the best known of these permanent alliances of hermit-crabs and zoophytes is that of *Eupagurus prideauxii*, an inhabitant of European seas, with the sea-anemone *Adamsia palliata*. In this case the sea-anemone is merely attached to the hermit's shell, but when the hermit changes its shell it takes its partner with it: the union, although it "bends with the remover to remove," is yet a fixed one.

With *Parapagurus pilosimanus*—one of the most characteristic crustaceans of the deep-sea—the alliance with a compound zoophyte of the genus *Epizoanthus* is, literally, fixed; for the two animals begin life, one as an indoor, the other as an outdoor tenant of the same shell, and as they grow the shell is gradually absorbed until at last the hermit-crab comes to lie in a tunnel of the common substance of the Epizoanthus-colony.

In the case of *Paguropsis typica* the association with a colonial sea-anemone of a genus related to *Mamillifera* is even more remarkable. Here there is no shell to play the part of "Sir Pandarus of Troy," but the sea-anemone settles upon the hinder part of the young hermit-crab's tail, and the two animals grow up together, in such a way that the spreading zoophytes form a blanket which the hermit can either draw completely forwards over its head or throw half-back, as it pleases.

In all these cases the happy results of commensalism are finely illustrated; for each animal, without exacting anything for itself, gives the other signal assistance—the zoophyte by protecting and masking the hermit-crab, the hermit-crab by continually carrying the zoophyte to rich pastures.

Though the typical Paguroid lives in a spiral shell, and bears its story in its tail, various other means of protection are employed by hermit-crabs. For instance, the members of the small family of perfectly symmetrical hermit-crabs, *Pylochelidæ*, hardly ever use a spiral shell; but either occupy holes in stones, or take sanctuary in living sponges, or impact themselves in tubes of water-logged (sunk) bamboo or mangrove, or occasionally in a tooth-shell, always closing the orifice of ingress with their stopper-like chelæ. *Xylopagurus* also shelters in sunken reeds and bits of wood, and several species of *Cancellus* find an asylum in holes in sponge and rock. In *Xylopagurus* and *Cancellus*, as already mentioned, the abdomen is straight and appears to be symmetrical; but that the symmetry is only secondarily acquired and superficial, and that these forms are descended from an ordinary asymmetrical stock, is proved by the fact that the posterior abdominal appendages—though present only in the female—exist only on the left side.

Certain forms which hide in holes do not regain even an apparent symmetry, such are the species of *Paguristes* that hides in living sponge, and the *Troglopagurus* that lives in small holes in coral.

Some of the land-hermits of the genus *Coenobita* out-grow the accommodation that, with due regard to portability, is afforded by a molluscan shell, and will use instead the husk of a fruit, or a piece of cocoanut shell, or even the bottom of a bottle.

Besides the *Lithodidæ*, a few true hermit-crabs, either on account of their large size, or by adaptation to particular conditions of life, are independent of foreign protection; such are *Birgus*, *Porcellanopagurus*, the persistent larval forms known as *Glaucothoë*, and perhaps also *Tylaspis* and *Ostraconotus*.

Intermediate between these perfectly independent forms, and those which borrow, or burrow, stands the remarkable *Paguropsis*, already mentioned, which though free is under contract for life, like the citizen of a state.

The majority of hermit-crabs are marine, a few species—not 2 *per cent.* of the whole number known—are adapted for life on land, though their larvæ remain aquatic.

In size the hermits vary greatly : at the one extreme we have *Cestopagurus olfaciens*, the adult female of which has a carapace 2 millim. long and a total weight (spirit specimen) of about half a grain, eggs included : at the other extreme there is *Birgus latro*, the adult male of which has a carapace over 185 millim. in length and a total weight (spirit specimen) of more than 40,000 grains.

The hermits, like other Decapod crustaceans, are scavengers, though the few species that live on land are also fruit-eaters.

The hermits furnish food to certain ground-feeding fishes ; but except to the savage and semi-savage inhabitants of tropical islands (who eat the land-hermits, and especially *Birgus latro*) they are of no *direct* use to man.

Beyond that the male is often larger than the female, and occasionally has larger chelipeds, and that in the female the unpaired abdominal appendages are better developed than they are in the male, there are no very obvious "secondary" differences between the sexes of the *Paguridea*.

Distribution of the Paguridea.

a.—Bathymetric Distribution.—Excluding the *Lithodidæ* which are not here under consideration, the number of species of Paguroids is a little over 450, of which less than 2 per cent. are land-hermits, about 60 per cent. are littoral, and about 39 per cent. are sub-littoral and abyssal. The number of Indian species, varieties not being separately reckoned, is just under 90—about one-fifth of the total known from all parts of the world.

If, as is reasonable, we take the complete absence of paired abdominal appendages (uropods not here included) to signify divergence from the ancestral stock and comparative recency of origin, and if we take the persistence of paired appendages on some of the segments of the abdomen to signify the reverse, then we find that the sub-littoral and abyssal Paguroids—as, indeed, Milne Edwards and Bouvier have already observed—are, as a whole, decidedly more archaic than the land and littoral forms, for of the latter only about 8 per cent. possess paired appendages on the anterior segments of the abdomen, while of the sub-littoral forms nearly 50 per cent. have such appendages in either one or both sexes.

b.—Geographical Distribution of the Indian Paguridea.—The affinities of the Indian Paguridea are exhibited in the following tables :

From these tables, whether we fix our attention on genera or on species, we observe two things.

First, that the littoral hermit-crabs of India, which include a majority of specialized and, probably, lately-evolved forms, are part of a fauna which, though to a certain extent showing a circumtropical distribution, is to a more marked extent accumulated in the Indo-Pacific, between East Africa and the eastern confines of Polynesia

Secondly, that the sublittoral hermit-crabs of India, which include a ponderous number of generalized and "primitive" forms, are part of a fauna which, though also showing a circumtropical tendency, is concentrated at certain definite points in the Northern Hemisphere and is correspondingly deficient at certain definite points in the Southern Hemisphere. The striking points of concentration are (1) the West Indian region—including, to a less noticeable extent, the Bay of Panama, (2) that part of the North Atlantic Ocean that includes the Azores and Cape Verde Islands, and that washes the coasts of north-west Africa, and (3) Oriental Seas from Indian to the Philippines (and Japan); and the striking deficiencies are (1) the South Atlantic coasts, especially those of Africa, and (2) the south-western parts of the Indian Ocean.

If the Indo-Pacific unity of the more-recently-evolved land and littoral elements of the local Paguroid fauna be a natural consequence of the open communications, under uniform conditions, of the present time, then, conversely, it seems reasonable to argue that we have a clue to the ancient communications of the seas of India in the concurrences of the more archaic sublittoral element.

In other words, it seems to me that the sublittoral hermit-crabs of the local seas are the remnant of the sublittoral fauna of a chain of seas, or archipelagos, that may, at a former time, have extended, under uniform conditions, north of the equator, from Panama eastwards, by way of north-west Africa, into the heart of the East Indian Archipelago

I know that I am here sailing into very troubled waters, but it seems to me that the evidence from Zoological Distribution cannot be disregarded in restoring the outlines of extinct geography.

In an *Account of the Indian Deep-sea Madreporaria* I have specified certain other elements of the Indian sublittoral fauna that have the same curious residual distribution as the hermit-crabs, and have suggested an analogy with the phenomenon of Alpine floras as an explanation; and in an *Account of the Deep-sea Brachyura collected by the "Investigator"* I have drawn attention to certain sublittoral genera of crabs that exhibit the same peculiarity of range.

Table I. Generic Distribution of the Indian Hermit-crabs.

	West Indian region, Florida to Pernambuco.	North Atlantic coasts of United States, etc.	South Atlantic coasts of America.	North Atlantic coasts of Europe and N.-W. Africa	Mediterranean.	South Atlantic; S African side.	East coast of Africa (including Red Sea)	Oriental Seas to Philippines and Arafura Sea.	Seas of Japan and China.	Seas of E. Australia and New Zealand.	Polynesia.	Panama region.	Pacific coasts of N. America.	Pacific coasts of S America.	Arctic and sub-arctic Seas.
				I.	*Land Genera.*										
Coenobita	*	...	...	...	..	*	*	*	*	*	*	*	*	*	...
Birgus	–	...	...	...	...	...	*	*	*	*	*	...	...	...	...
				II	*Littoral Genera.*										
Clibanarius	*	*	*	*	*	*	*	*	*	*	*	*	*	...	...
Calcinus	*	*	*	*	*	...	*	*	*	*	*	*	*	*	...
Pagurus (not including *Petrochirus*)	*	.	*	*	*	1 sp. St. Hela	*	*	*	*	*	*	...	...	...
Diogenes	...	...	..	*	*	1 sp. Cape.	*	*	*	*	*	...	..	...	..
Aniculus	...	..	..	...	...	...	*	*	*	*	*	*	.	...	...
Cestopagurus	..	..	...	...	...	...	*	*	..		..	...	...	...	...
Troglopagurus	...	...	..	...	...	...	*	*	...	.	...	..	.	...	...
				III.	*Sublittoral Genera.*										
Parapagurus	*	*	*	*	..	*	..	*	*	*	...	*	*	*	...
Paguristes	*	...	...	*	*	1 sp. Cape.	1 sp. G. Aden	*	*	*	..	*	*	*	...
Eupagurus	*	*	*	*	*	1 sp. Trist. d'Acunh	...	*	*	*	*	*	*	*	*
Anapagurus	*	...	...	*	*	1 sp. Cape.	...	*	*	...	...	...	...	...	...
Pylocheles	*	...	...	.	...	...		*	...	...	...	...	...	...	...
Chiroplatæa	*	...	..	...	...	...	...	*	..	.	..	...	...	...	...
Cancellus	*	...	...	*	...	...	...	*	.	*	...	*	...	...	...
Sympagurus	*	*	...	*	...	...	...	*	...	*	...	...	..	...	...
Spiropagurus	*	...	...	*	...	...	...	*	*	...	...	*	...	...	..
Catapagurus	*	*	...	...	...	...	...	*	*	...	...	*	..	...	...
Tomopaguropsis	*	...	...	...	...	...	...	*	...	...	...	...	..	...	...
Glaucothoe	..	...	..	*	...	...	...	*	*	*	...	..	...	...	..
Nematopagurus	...	..	...	*	*	...	...	*	...	..	...	...	...	...	...
Pagurodes	...	...	...	.	...	...	...	*	...	*	...	...	...	...	...
Paguropsis	...	...	...	..	..	...	...	*	...	...	..	...	..	...	...
Parapylocheles		..	...	...	...	...	...	*	...	...	...	...	...	...	...
Pylopaguropsis	...	...	...	..	...	...	...	*	..	.	...	...	...	...	...

N.B.—The Equator is taken as the dividing line between the North and South Atlantic and Pacific Oceans.

Table II. Specific Distribution of the Indian Hermit-crabs and Crab-hermits.

Name of Genus.	Number of Indian species (varieties not separated).	Indian species extending (1) westwards to E. Africa, and (2) eastwards to the Pacific—*both ways*.	Indian species extending westwards to *E. Africa only*.	Indian species extending eastwards to the *Pacific only*.	Indian species, or varieties, or closely related species found in the eastern part of the North Atlantic.	Indian species, or varieties, or closely related species found in the West Indian region.	Number of species peculiar to India.	Remarks.
			I. Littoral Genera.					
Coenobita ...	4	4	...	...	...	...	...	2 of them also to W. Africa.
Birgus ...	1	1	...	...	..		...	
			II. Littoral Genera					
Clibanarius ...	11	5	...	3	...	(1)*	3	* a sublittoral species from 102 fath
Calcinus ...	5	3	...	2	..		.	
Pagurus ...	12 (or 13)	7 (or 8)	..	4	1*	1*	1	* *P. striatus* (Philippines and Japan) a sublittoral species.
Diogenes ...	10	1	...	2	.	...	7	
Aniculus ...	3	2	..	...	...	...	1*	* from 102 fath.
Troglopagurus ...	2	...	1	...	...		1	
Cestopagurus	1	.	...	...	...	...	1	
			III. Sublittoral Genera					
Pylocheles ...	1	.	..	..	..	(1)*	1	* *P. agassizii* very close to *P. miersii*.
Glaucothoe ...	1*	..	.	...	(1)	...	1	* *G. prox. peronii*.
Sympagurus ...	2	..	..	...	1†	2*†		* *S. arcuatus* and † *bicristatus*.
Paguristes ..	9	...	...	1†	(1)*	...	8	* *P. balanophilus* very close to *P. ochlatus*. † *P. hians* (Philippines).
Cancellus ...	1	...	...	...	(1)*	...	1	* *C. investigatoris* hardly different from *C. parfaiti*.
Nematopagurus ...	5	.	...	...	(1)*	...	5	* *N. indicus* hardly different from *N. longicornis*.
Eupagurus ...	7	...	...	1†	(1)*	...	6	* *E. carpoforaminatus* very close to *E. prideauxii*. † *E. zebra* (Australia).
Chiroplatæa ...	1	...	...	...	..	...	1	
Paguropsis ...	1	...	...	1*	...		...	* *P. typica* (Philippines).
Spiropagurus ...	1	...	..	1*	..	.	...	* *S. spiriger* (Japan).
Pagurodes ...	1	...	...	1*	...	...	..	* *P. limatulus* (Philippines).
Catapagurus ...	1	...	..	...	...	...	1	
Anapagurus ...	1	...	...	...	...	...	1	
Parapylocheles ...	1	...	...	...	...	...	1	
Tomopaguropsis ...	1	...	...	...	...	...	1*	* The only other species known is West Indian.
Pylopaguropsis ..	1	...	...	...	..	...	1	
Parapagurus ..	3	...	...	1*	1*	1*	2	* The abyssal and cosmopolitan *P. pilosimanus*.
Lithodes ...	1	...	..	...	1*	1*	...	* *L. agassizii*
Paralomis ...	2	...	...	.	...	..	2	

PAGURIDES.

Paguroidæ, Boas, Vid. Selsk. Skr., 6 Række, Nat. og Math. Afd. 1. 2. 1880, p. 189.

Paguridea, Henderson, Challenger Anomura, 1888, p. 40: Ortmann, in Bronn's Thier Reich, Malacostraca, p. 1143.

Paguridæ, Milne Edwards and Bouvier, Crust. Décap. Hirondelle (Suppl.) et Princessee Alice, Monaco, 1899, p. 51.

Paguridea, Alcock, Cat. Indian Deep Sea Crust., 1901, p. 208.

Carapace either elongate and subcylindrical, or broad and crab-like, the front not fused with the epistome: rostrum present or absent. The abdomen is usually soft, asymmetrical, and spirally coiled; or it may be merely bent; or flexed against the thoracic sternum as in crabs; very rarely is it symmetrical, straight, and dorsally well calcified. The tail-fan is usually present and asymmetrical, occasionally it is quite symmetrical; or it may be absent.

The eyes are never contained in orbits. The antennular peduncle is flexed, and the flagella are generally short. The antennal peduncle is five-jointed, the second joint almost always carries a moveable acicle.

The flagella of the exopodites of the maxillipeds, when present, are flexed inwards. The external maxillipeds are pediform.

The thoracic legs never carry epipodites. The 1st pair are chelate and usually massive; the 5th pair are always, and the 4th pair commonly, much less developed than those in front of them.

It is very unusual for *all* the abdominal somites to carry paired appendages: sometimes these may be present, in a modified form, on the 1st or the first two abdominal somites; but as a general rule abdominal appendages are present on one side only, usually the left side, of the 2nd-4th or 2nd-5th somites: occasionally, in the male abdominal appendages are altogether wanting.

It is now generally agreed that the Pagurides spring from a common stock with the Thalassinoid Macrura. Borradaile lays stress on this view by including the Thalassinidea with the Anomura, which I think is going too far, as being likely to confuse the systematist, while suggestive of little to the morphologist, who already realizes that between the Macrura and the Anomura—as also between the Macrura and the Brachyura—there are no gaps.

Key to the Families of Pagurides.

1. Uropods present: penultimate pair of thoracic legs much shorter than those in front of them:—

   1. Abdomen straight and perfectly symmetrical, with all its terga well developed and in contact, and with 5 pairs of symmetrical appendages besides the uropods — — — PYLOCHELIDÆ.

2. Paired appendages never present on all the abdominal somites :—
   i. The antennular flagella end in a filament: the antennular peduncles rarely approach the carapace in length. ... PAGURIDÆ. p 21
   ii. The antennular flagella end abruptly and bluntly; the antennular peduncles are nearly as long as, or even longer than, the carapace ... ... — — COENOBITIDÆ. p 138.

11. Uropods absent: carapace crab-shaped: penultimate pair of thoracic legs at least as well developed as those in front of them — LITHODIDÆ.

It is now agreed that the *Lithodidæ* are merely modified Eupagurines and Pagurines. As the three Indian representatives of the family belong to the fauna of the deep sea and have already been sufficiently described in the *Catalogue of Indian Deep-sea Crustacea*, they will not be further noticed here.

Family PYLOCHELIDÆ, Spence Bate.

Pylochelidæ, Spence Bate, Challenger Macrura, 1888, p. 11: Ortmann, in Bronn's Thier Reich, Malacostraca, p. 1144: Alcock, Investigator Macrura and Anomala, p. 209.

Body straight and perfectly symmetrical in itself and in its appendages. Cephalothorax subcylindrical. The abdomen, which is carried quite straight, has all its terga well developed and in contact with one another, and ends in a symmetrical (rarely somewhat unsymmetrical) tail-fan. Thoracic sternum linear. Rostrum wanting, or quite inconspicuous.

Ophthalmic somite more or less exposed. Antennal acicle well developed. The upper antennular flagellum is more than half the length of the peduncle.

External maxillipeds approximated at base: their exopodite ending in a flagellum.

The chelipeds are equal and massive. The thoracic legs of the 2nd and 3rd pairs are long: those of the 4th and 5th pairs are very short and are subchelate, or at least have the dactyl much reduced.

The first six abdominal somites each carry a pair of appendages as in the Macrura.

The gills are trichobranchiæ.

This family is closely related to the Thalassinoid Macrura, and, indeed, is seated in the borderland between the two sub-orders Macrura and Anomura. It is represented by nearly allied forms in the seas of Japan, the East Indian Archipelago and south-eastern Australia, the Andamans, and the West Indies and neighbouring coast of North America, usually at depths over 150 fathoms. The eggs, so far as they are known, are of large size and comparatively few in number, and this implies that the newly-hatched young are in an advanced stage of development; so that the curious geographical distribution of

this singular little family is hardly to be explained by any theory of transport of pelagic larvæ by ocean currents.

Key to the genera of the family Pylochelidæ.

Indian genera are printed in capitals.

I. External maxillipeds cheliform : hands of chelipeds forming an operculum by their apposition :—

1. Eyes large, eyestalks very freely movable ... ... PYLOCHELES.
2. Eyes small, pale, obsolescent : eyestalks with somewhat limited motion ... ... CHIROPLATÆA.

II. External maxillipeds not cheliform :—

1. Eyes well developed : branchiæ 14 pairs * :—
   - i Hands of chelipeds forming an operculum ... ... POMATOCHELES.
   - ii. Chelipeds not operculiform ... ... MIXTOPAGURUS.
2. Eyes very small and pale : plumose branchiæ 12 pairs only ... PARAPYLOCHELES.

By the favour of the Director of the British Museum and of Mr. Jeffrey Bell, I have examined the pieces of Miers' type of *Pomatocheles jeffreysi*, the ghost-like shell of Spence Bate's *Chiroplatæa cenobita*, and Henderson's *Pylocheles spinosus*. *Chiroplatæa cenobita* alone of them has cheliform external maxillipeds.

I have here kept *Pylocheles* and *Chiroplatæa* distinct, but they might just as well be united, as is suggested by MM. Milne Edwards and Bouvier; so also with *Pomatocheles* and *Mixtopagurus*. About *Parapylocheles*, however, there is no confusion.

PYLOCHELES, A. Milne Edwards.

Pylocheles, A. Milne Edwards, Bull. Mus. Comp. Zool. Harvard, VIII, 1880, p. 38: Milne Edwards and Bouvier, Mem. Mus. Comp. Zool. Harvard, XIV, No. 3, 1893, p.17; Stebbing, Hist. Crust., 1893, p. 169 : Ortmann, in Bronn's Thier Reich, Malacostraca, p. 1144 : Young, Stalk-eyed Crust. W. Indies, etc., p. 388; Alcock, Investigator Macrura and Anomala, p. 210.

Body perfectly straight and bilaterally symmetrical, as in any Macrurous crustacean : the abdominal terga all in contact.

Carapace about half as long as the abdomen, well calcified dorsally but membranous laterally, the cervical groove well defined. No rostrum.

Abdominal terga and telson well calcified, as are the fairly well developed pleura of the 2-5 somites. Telson broad, divided into two parts by a transverse suture. Caudal swimmerets quite symmetrical, not so large or long as the telson, well calcified, the outer part of the dorsal surface of both exopodite and endopodite with a pavement of small sharp setose tubercles.

* *in Mixtopagurus.*

Ophthalmic scales small, widely separated : eyestalks long, eyes large.

The upper is much the longer of the two antennular flagella, and is more than half the length of the peduncle. The 2nd joint of the antennal peduncle has its antero-external angle produced to form a serrated spine inside which is a similar but larger spine (acicle).

The mandibles have a smooth subcircular molar facet lying at right angles with a strong sharp incisor process, and have a three-jointed incurved endopodite (palp).

The 1st and 2nd maxillæ have the coxopodite, basipodite, and endopodite well developed : in the 2nd maxillæ the coxopodite and basipodite are deeply cleft and the scaphognathite is posteriorly truncated : in the 1st maxillæ the endopodite (palp) has no flagellum.

All 3 pairs of maxillipeds have well developed flagellate exopodites, but none of them except the 1st pair have epipodites, nor are there any epipodites on any of the thoracic legs. The 2nd and 3rd (external) maxillipeds are pediform and 7-jointed, the external maxillipeds, which are in contact with one another at base, ending in a nearly perfect chela in which the dactylus is a little longer and slenderer than the fixed finger.

The thoracic legs of the 1st pair are equal, massive, and symmetrical, having the wrist and hand twisted inwards so that the outer surface of the hand becomes superior : the anterior edge of the carpus is produced as a crest that overhangs the hand, and the hands, which have the palm dorsally flattened, can be juxtaposed along the whole of their perfectly straight inner edge and can be flexed vertically almost at right angles with the carpus, so as to form an operculum to the cavity in which the animal hides itself : the fingers are short, with sharp strongly-calcified tips.

The legs of the 2nd and 3rd pairs are long, slender and compressed, and end in elongate curved dactyli : those of the 4th and 5th pairs are short and subchelate, their dactyli being very short and claw-like and a good deal concealed in setæ.

The abdominal appendages of the 1st somite are uniramous in both sexes, and in the male have an almost foliaceous tip : those of the 2nd-5th somites are slender and biramous in the female, but are uniramous in the male in which sex also those of the 2nd somite are particularly long and strong and end in a spathulate joint.

The gills are 14 on either side, disposed as follows :—a pair of arthrobranchs to each segment from the IXth (external maxillipeds) to the XIIIth, and a pleurobranch on each segment from the XIth to the XIVth. The gill-elements are filaments arranged in double rows on either side of a shaft (quadriserial).

The genus is represented in moderate depths in the Caribbean and Andaman Seas.

1. PYLOCHELES MIERSII, Alcock and Anderson, Plate I., fig. 2.

Pylocheles miersii, Alcock and Anderson, Ann. Mag Nat. Hist., January 1899, p. 14. Illustrations of the Zoology of the Investigator, Crustacea, Plate XLIII, fig. 4. Alcock, Investigator Macrura and Anomala, p. 212.

Carapace cuboidal, its membranous lateral walls being vertical, its anterior border faintly sinuous, its dorsum quite free of setæ.

The abdominal terga 2-5 are separated from their pleura by a groove, and the pleura 2-4 each have a longitudinal crescentic groove. The 6th tergum is much longer than any of the others. The posterior segment of the telson is obscurely bilobed. There are setæ on the edges of the pleura and on the surface and edges of the telson and caudal swimmerets, but not on any other part of the abdomen.

Ophthalmic scales obsolescent: eyestalks half as long as the carapace, a narrow strip along their sides is imperfectly calcified: eyes markedly reniform.

The 2nd joint of the antennular peduncle is the longest and the 3rd the shortest: the upper antennular flagellum is nearly two-thirds the length of the carapace. The entire length of the antennular peduncle is about two-thirds that of the carapace.

The inner of the 2 acicles of the 2nd joint of the antennal peduncle reaches more than half-way along the eyestalk, the outer is shorter, both are obscurely serrated: the antennal flagellum is longer than the carapace.

The external maxillipeds reach as far as the tip of the eyes.

The great chelipeds, which are perfectly equal, are not quite two-thirds the length of the body, nearly half their extent being contributed by the hand. The merus and ischium are smooth, and their common inner surface is marked by an elongate-oval ring of imperfectly calcified integument: the trigonal carpus has its lower border very short, but its upper surface is three-fourths the length of the palm, is finely rugose, and has its anterior edge produced to form a salient bilobed and finely serrated setose crest: the lower surface of the hand is convex and smooth, but the upper surface is flat, closely pitted and thickly covered with setæ like a mat, and has its edges serrulate: the fingers are not much more than half the length of the palm.

The 2nd and 3rd pair of legs closely resemble one another, both having smooth compressed joints and ending in a long acute dactylus, which is at least as long as the propodite and longer than the merus: the 2nd pair, which

are slightly the longer, are about as long as the body without the telson ; both pairs, when extended, reach beyond the 1st pair.

The 4th pair of legs are as long as the carapace : their joints, though compressed, are stout, and their dactylus is a short stout claw, which forms with the produced angle of the setose propodite a subchela.

The 5th pair of legs are shorter than the carapace : they resemble the 4th pair in having a setose propodite and a very short claw-like dactylus, which, however, folds against the distal end of the propodite to form an imperfect subchela.

In the male the 2nd pair of abdominal appendages are two-thirds the length of the carapace : they are strongly calcified, and their terminal joint is angularly club-shaped.

Colours in life : upper surface of carapace and legs orange, lower surface white, eyes brown, eggs bright yellow. Spirit specimens are cream-colour with some iridescence on the gastric region and on most of the abdominal terga.

In a male the length of the carapace is 10 millim., of the abdomen 21 millim. An egg-laden female is a little larger. The eggs, though large, are fairly numerous.

All the specimens known were found tightly impacted in sunken drift twigs of bamboo and mangrove.

$\frac{2202\text{-}2205}{10}$, $\frac{2207\text{-}2208}{10}$ } Andaman S., off the E. coast of N. Andaman I., 185 fath. "Investigator."

Chiroplatæa, Spence Bate.

Chiroplatæa, Spence Bate, Challenger Crustacea Macrura, 1888, p. 11 : T. R. R. Stebbing, Hist. Crust., 1893, p. 170 : Ortmann in Bronn's Thier-Reich, Malacostraca, p. 1144.

Chiroplatæa differs from *Pylocheles* (which it resembles in habits) only in the following particulars :—

(1) The eyes are obsolescent, being non-facetted, devoid of proper pigment, and hardly differentiated from the eyestalks.

(2) The antennular peduncles are much longer than the carapace.

Chiroplatæa has been found in the Banda Sea (East Indian Archipelago) at 200 fathoms, in the Bay of Bengal at 419 fathoms, and, according to Ortmann, in the Gulf of Mexico. Its distribution corresponds with that of *Pylocheles* and *Tomopaguropsis* (also with that of the Macrurous *Phoberus*, the Brachyurous *Acanthodromia* and *Trichopeltarium*, and the Isopod *Bathynomus*—all being remarkable sublittoral forms).

1. CHIROPLATÆA MACGILCHRISTI. Plate I, fig. 3.

Closely resembles *C. cenobita*, Spence Bate, from the Banda Sea, differing principally in the sculpture of the opercular facet of the chelipeds and in the form of the telson.

The form of the body (carapace and abdomen) repeats that of *Pylocheles miersii*, the only obvious difference being that in the present species the antennal angles of the carapace are more prominent and acute, and that the ophthalmic somite is thus better concealed.

Eyestalks much less than half the length of the anterior border of the carapace, tapering from a somewhat swollen base, their mobility somewhat limited. Ophthalmic scales absent, the basal joint of the eyestalk being concealed. Eyes devoid of facets and of proper pigment, only distinguishable from the eyestalks (in spirit specimens) by their smoother surface and more milky-yellow colour.

Antennular peduncles longer than the carapace; the upper flagellum more than half the length of the carapace.

The antennal peduncles reach to about the middle of the 2nd joint of the antennular peduncles: the spiniform prolongation of the 2nd joint, and the acicle, are serrated, the latter reaching well beyond the base of the terminal joint: the flagellum is nude and half again as long as the carapace.

The chelipeds are perfectly equal, about 1⅓rd times the length of the carapace, operculiform, and in general form resemble those of *Pylocheles miersii*. The overhanging anterior crest of the wrist is bilobed, with the apex of each lobe capped by a patch of bead-like granules, and the edge plumose and finely crenulate. The edges of the hand and fingers are plumose. The opercular facet of the hand is flat, or slightly concave: it has some setose bead-like granules at its base and along its inner border, and is longitudinally traversed by a slightly-curved granulous crest, stopping at the finger-cleft: the fingers are not much more than half the length of the palm, and meet at tip only.

The 2nd and 3rd pairs of legs surpass the chelipeds: they are smooth, and their setose dactylus is very little longer than the propodite.

The 4th pair of legs are hardly subchelate, and the 5th pair are chelate: the 5th pair has the usual pavement of imbricating granules on the outer surface of the propodite; but in the 4th pair this is represented by a narrow band of spinules on the lower border of the propodite.

The distal moiety of the telson is much longer than the proximal moiety, and is expanded distally.

The length of the body of an egg-laden female is 36 millim., the carapace occupying 12 millim. An apparently adult male is much smaller.

Colours in spirit pinkish-yellow, the gastric region iridescent.

The animal inhabits the tube of sunken twigs of drift bamboo, closing the orifice with its stopper-like chelæ.

$\frac{4759 \cdot 60}{10}$ Bay of Bengal, off Arakan coast, 419 fath. "Investigator."

Parapylocheles, Alcock.

Parapylocheles, Alcock, Investigator Macrura and Anomala, 1901, p. 213.

Differs from *Pylocheles* in the following characters *only* :—

A little rostrum projects between the bases of the eyestalks, and the lineæ anomuricæ are distinct, though they do not reach the posterior border of the carapace.

Though the abdomen is faultlessly symmetrical, and though all the abdominal terga are well defined and in close contact, yet there are no pleura, and on the ventral surface of the abdomen (except for the presence of appendages) there is no visible segmentation : moreover, some of the terga are somewhat ill-calcified. The telson is not divided by a transverse suture, and is not so long as the caudal swimmerets.

The ophthalmic scales are in contact and the eyes are small and pale.

The external maxillipeds are not chelate, though they are in close contact with one another at base.

The thoracic legs of the 1st pair, though symmetrical and equal and more massive than any of the other legs, have a carpus of ordinary form and a subcylindrical hand not modified to form a stopper.

In the female the abdominal appendages of the 1st pair are slender and uniramous, and those of the 2nd-5th pairs are slender and biramous with one ramus rudimentary : in the male all, from the 1st to the 5th are uniramous, and only those of the 2nd pair are of any size.

The branchial formula is exactly the same as that of *Pylocheles*, but the arthrobranchiæ of somite IX (external maxillipeds) are mere non-plumose fleshy lobes ; there are thus only 12 *functional* branchiæ on either side, namely, 4 pairs of arthrobranchiæ (on somites X—XIII), and 4 pleurobranchiæ (on somites XI—XIV).

From *Mixtopagurus* it differs in having the abdomen softer and the ophthalmic scales in contact, the eyestalks tapering, and the eyes pale and small. Also in having only 12 functional branchiæ on either side.

1. PARAPYLOCHELES SCORPIO, Alcock. Plate I., fig. 1.

Pylocheles scorpio, Alcock, Ann. Mag. Nat. Hist., March, 1894, p. 244 ; Illustrations of the Zoology of the Investigator, Crustacea, Plate IX, fig. 7 ; Investigator Macrura and Anomala, p. 214.

Body long and slender, with a wasp-like constriction between the cephalothorax and abdomen, cephalothorax subcylindrical. Carapace half the length of the abdomen ; strongly calcified, smooth and polished in front of the cervical groove, behind which it is less strongly calcified dorsally and membranous laterally : the frontal margin is much excavated behind the eyestalks, between which a small rostrum projects, and on the outer angle of either orbital notch is a pair of spinules.

All the abdominal terga are distinct and symmetrical : the 1st which is extremely small, and the 6th which is suboval, are strongly calcified, but the 2nd-5th, which are subrectangular plates, are feebly calcified, except a patch in the middle of the posterior border of the 5th : their edges are setose, as also is the surface of the 6th and of the telson. The caudal swimmerets are perfectly symmetrical ; the outer part of the dorsal surface of both endopodite and exopodite has a pavement of small setose bead-like tubercles.

The eyestalks, which are about a third the length of the carapace, taper from a broadish base up to a small pale eye : their dorsal surface is finely serrated and setose towards the edges.

The antennular peduncle is more than half the length of the carapace, the 3rd joint being the longest and the basal joint the shortest : the upper flagellum, which tapers to a setaceous filament, is nearly as long as the peduncle, the lower is, in the female, a short fine filament.

The antennal peduncle exceeds the eye by nearly as much as it falls short of the antennular peduncle : the finely serrated acicle reaches a little beyond the eye : the flagellum is over half the length of the body.

The large chelipeds, which are equal to one another and quite symmetrical, are about as long as the abdomen : their upper surface is setose, especially on the hand : their ischium and merus are elegantly toothed along the inner edge, where they meet their fellows, across the mouth parts, in a perfectly straight line : their hand, which is subcylindrical, is about twice the greatest length of the carpus : the fingers, which are a little more than half the length of the palm, have hard horny tips, and move in a horizontal plane.

The 2nd and 3rd thoracic legs are a little longer than the chelipeds : their joints are smooth and compressed, with sparsely setose edges, and though the dactylus is a long joint, it is only about half the length of the propodite.

The 4th and 5th legs (coxal joint included) are only about half as long as the carapace: both are subchelate and have a short broad propodite and a tiny claw-like dactylus, the propodite having a pavement-like patch of setose granules on its outer surface.

In the female the appendages of the 1st abdominal somite are uniramous, those of all the other somites are biramous: in the male the abdominal appendages 1-5 are all uniramous.

Colour in life, dull chalky red.

The female is 28 millim. long, the carapace being 9 millim.; the male is larger.

$\left.\begin{matrix}\frac{6891}{9} \\ \frac{1839}{10}\end{matrix}\right\}$ Andaman Sea, 405 fathoms. "Investigator."

Family PAGURIDÆ, Dana.

Paguridæ, Dana, U. S. Expl. Exp., Crust., pt. I., 1852, p. 435: Stimpson, Proc. Acad. Nat. Sci. Philad. (1858), 1859, p. 232: Henderson, Challenger Anomura, 1888, p. 52: T R. R. Stebbing, Hist. Crust., 1893, p. 159: Ortmann in Bronn's Thier-Reich, Malacostraca, p. 1145: Bouvier, Feuille des Jeunes Naturalistes, Paris, Juin–Juillet, 1896: Milne Edwards and Bouvier, (part) Crust., Décap. Hirondelle et Princesse Alice, Monaco, 1899, p. 51: Alcock, Cat. Indian Deep Sea Crust, 1901, p. 215.

Paguroidæ (part) Boas, Vidensk. Selsk. Skr., 6 Raekke, naturvid. og math., Afd. I. 2, 1880, p. 189.

Parapaguridæ, Smith, Bull. Mus. Comp. Zool., Harvard, X., 1883, p. 20: Henderson, Challenger Anomura, p. 85; T R. R. Stebbing, Hist. Crust., p. 166.

Carapace usually somewhat elongate, and somewhat broadened posteriorly and feebly calcified laterally. Rostrum sometimes fairly prominent; sometimes obsolescent and leaving the ophthalmic segment exposed. Thoracic sterna variable in breadth.

The abdomen is generally soft and spirally coiled in adaptation to the form of the cast-off gastropod shell which the animal generally uses as a habitation: in a few abnormal forms that do not use a gastropod shell the abdomen may re-acquire a secondary symmetry of a sort.

Ophthalmic scales and antennal acicle present and often large. The antennular peduncle is usually of moderate length and the flagella are usually short.

Chelipeds usually massive: they may be equal and similar, or very unequal and dissimilar. The legs of the 2nd and 3rd pair are elongate: those of the 4th and 5th pair are short, the 4th pair being simple, or subcheliform, or cheliform, the 5th pair being subcheliform or cheliform.

Never do all the abdominal segments bear paired appendages: usually the appendages are on the left side only, and are present on somites 2-5 or 3-5: occasionally the first, or first and second, abdominal segments of the male, and the first abdominal segment of the female carry a pair of appendages modified for sexual purposes.

The telson is usually more developed on the left side than the right, as also are the caudal appendages or uropods.

The gills may be phyllobranchiæ or trichobranchiæ, or may be intermediate between the two.

Milne Edwards and Bouvier divide the *Paguridæ* into two sections, namely, *Mixtopagurinæ* (*Mixtopaguriæa*), in which the external maxillipeds are juxtaposed at base, and *Eupagurinæ* (*Eupaguriæa*), in which the bases of the external maxillipeds are widely separated by a sternum.

As the *Mixtopagurinæ* of these authors also includes the symmetrical forms here separated as *Pylochelidæ*, I prefer to adopt the scheme of Ortmann, who divides the family into two subfamilies, namely, *Paguringæ* (equivalent to the Mixtopagurinæ *minus* the Pylochelidæ) and *Eupagurinæ*.

In this place, and before the systematic consideration of the *Paguridæ* is undertaken, *Glaucothoe* may be mentioned.

Glaucothoe has by various authors been regarded as a distinct genus and ranked either with the Thalassinoids, or later, with the Paguroids; but it has held a disputed position among the latter ever since Spence Bate advanced the opinion that it is merely one of the larval stages of *Pagurus*. There is now plentiful evidence as to the existence of a glaucothoe-stage in the post-embryonic development of *Paguridæ*, and the luminous researches of Bouvier (Ann. Sci. Nat. Zool., 7 ser., XII., 1891, pp. 65—82) seem to establish the view that the "species" described under *Glaucothoe* are really only persistent larval forms of different Paguroids. Such persistent larvæ, or larvæ which in the course of their development have failed to follow the normal line of metamorphosis, but without complete arrest of growth in consequence, are not unknown in other groups of aquatic and amphibious animals.

Glaucothoe, Edw.

Glaucothoe, Milne Edwards, Ann. Sci. Nat. Zool., XIX., 1830, p. 334; and Hist. Nat. Crust., II., 1837, p. 306; and in Cuv. Règne Anim., Crust. (3rd Edit.), pl. xliii., fig. 2.

Prophylax, Latreille, in Cuvier Règne Anim., 2nd Edit., IV., 1830 p. 78.

Glaucothoe, Dana, U. S. Expl. Exp. Crust., Pt. I, 1852, p. 509: Spence Bate, Ann. Mag. Nat. Hist. (4), II., 1868, p. 115: Faxon, Mem. Mus. Comp. Zool., Harvard, IX, No. 1, 1882, pl. xiii., fig. 5: Henderson, Challenger Anomura, 1888, p. 83: Bouvier, Ann. Sci. Nat. Zool. (7), XII., 1891, pp. 65—82.

Bouvier *(loc. cit.)* has reviewed all the evidence, and has adequately confirmed the view that the Glaucothoes, which have been regarded as distinct species of a single genus, are merely persistent larval forms of Paguridæ of different genera.

As in the *Pylochelidæ*, the abdomen of *Glaucothoe* is perfectly symmetrical and ends in a symmetrical tail-fan; but the *first abdominal segment is destitute of appendages*, although there are paired, symmetrical, biramous appendages on all the succeeding segments of the abdomen.

The ophthalmic scales are wanting. The rostrum may be present or absent. The external maxillipeds may be either juxtaposed or widely separated at base. The chelipeds may be equal or one may be vastly larger than the other, but the fingers move in an oblique plane. The gills are phyllobranchiæ and may be either 11 or 13 on either side.

Glaucothoe sp. prox. peronii.

Glaucothoe, Henderson, J. A. S. B., LXV., pt. 2, 1896, p. 535.

Except in the more prominent rostrum, the granulous large (right) cheliped, and the longer dactyli of the 2nd and 3rd legs, this form agrees with *G. peronii*, Edw. It has the same enormous *Squilla*-like eyes.

The single specimen is not in a fit condition for description or figuring.

Length of carapace about 6 millim.; of abdomen about 14 millim.

$\frac{1116}{10}$ Between Maldives and C. Comorin. 719 fath "Investigator."

Key to the Genera of the Family Paguridæ.

Indian Genera are printed in capitals.

Bouvier, in *La Feuille des Jeunes Naturalistes* for June and July 1896, has published dichotomous tables of the genera of European Paguridæ, and upon those tables the following key is based :—

Section I.—The external maxillipeds are approximated at base: the chelipeds are equal, or subequal, or the *left* is vastly the larger; very rarely is the right slightly, never is it vastly, larger than the left .... [= Paguринæ Ortm.]

SECTION II.—The external maxillipeds are widely separated at base: the *right* cheliped is usually vastly larger than the left, the left is never larger than the right; occasionally they are subequal .. .. [= EUPAGURINÆ, Ortm.]

Section I. PAGURINÆ: the external maxillipeds are juxtaposed at base,* etc.

A. Paired appendages present on the first two abdominal segments of the male and first abdominal segment of the female: fingers of chelipeds opening and closing horizontally:—

I. Eyestalks short and stout: 4th pair of legs chelate ... PAGUROPSIS.

II. Eyestalks long, slender: 4th pair of legs non-chelate ... PAGURISTES.

B. No *paired* appendages on the anterior abdominal segments of either sex:—

I. Fingers of chelipeds opening and closing horizontally (chelipeds subequal):—

i. Fingers spooned: antennal flagellum long and not setose ... ... CLIBANARIUS.

ii. Fingers acuminate; antennal flagellum short and much ciliated ... ... *Isocheles.*

II. Fingers opening and closing obliquely or nearly vertically:—

i. Chelipeds equal and modified to form an operculum (tail-fan quite symmetrical) ... CANCELLUS.

ii. Chelipeds subequal, the *right* slightly larger than the left ... ... *Petrochirus.*

iii. The chelipeds may be subequal, but the *left* is usually vastly the larger:—

a. Finger-tips corneous and blackened:—

a. Chelipeds occasionally subequal, but the left is usually vastly the larger; finger-tips somewhat spooned ... ... PAGURUS.

b. Chelipeds subequal; finger-tips hoof-shaped: chelipeds and next two pairs of legs transversely ringed or scutellated ... *ANICULUS.

* In *Aniculus strigatus*, a species with a very broad flat body, the external maxillipeds are considerably separated at base. This is not simply the effect of the flattening of the cephalothorax; for in *Diogenes miles* (Herbst), with an equally broad flat body there is no such separation of the external maxillipeds

b. Finger-tips calcareous: left cheliped vastly the larger:—

a. Rostrum replaced by a movable scale or spine (a process from the ophthalmic somite) lying between the eyestalks ... DIOGENES.

b. No movable rostral scale:—

α. Antennal flagellum and left hand bare; chelipeds and legs of porcellanous texture and often brilliantly variegated ... ... CALCINUS.

β. Antennal flagellum and left hand thickly setose ... TROGLOPAGURUS.

N. B.—*Holopagurus*, Holmes (Synopsis of Californian Stalk-eyed Crustacea, in Occasional Papers of the Californian Academy of Sciences, VII., 1900, p. 153), seems to be an *Isocheles* in which the left cheliped is larger than the right.

Stratiotes, Thomson (Trans. and Proc. New-Zealand Inst., Vol. XXXI., 1898, pp. 171 and 185), may perhaps be identical with *Troglopagurus*.

Gryllopagurus, Zietz (Trans. Roy. Soc. S. Australia, X (1887), 1888, p. 298), is identical with *Cancellus*.

Section II. EUPAGURINÆ: the external maxillipeds are widely separated at base by a sternum, etc.

A. Fingers opening and closing obliquely: vas deferens not protruding:—

I. A pair of appendages on the first and second abdominal segments of the *male only*:—

i. Gills trichobranchiæ (quadriserial) ... PARAPAGURUS.

ii. Gills phyllobranchiæ (biserial):—

a. Rostrum obsolescent, abdomen spiral ... SYMPAGURUS.

b. Rostrum prominent, abdomen straight ... *Tylaspis*.

II. A pair of appendages on the first abdominal segment of the *female only*:—

i. Gills eleven on either side ... ... *Pylopagurus*.

ii. Gills thirteen on either side ... ... PYLOPAGUROPSIS.

B. Fingers opening and closing horizontally:—

I. Vas deferens not protruding in the form of a tube:—

i. A pair of appendages on the first and second abdominal segments of the *male only*: abdomen straight and ending in a perfectly symmetrical shield ... ... *Xylopagurus*.

ii. A pair of appendages on the first abdominal segment of the male only :—

a. Gills eleven on either side ... *Tomopagurus*.

b. Gills thirteen on either side — TOMOPAGUROPSIS.

iii. No paired appendages on the abdomen of the male :—

a. A pair of appendages on the first abdominal segment of the female — *Munidopagurus*.

b. No paired appendages on the abdomen of the female :—

a. Abdomen symmetrical and quite rudimentary ... — *Ostraconotus*.

b. Abdomen well-developed, spirally coiled ... — — EUPAGURUS.

II. Vas deferens produced, on one or both sides, into a tube : no paired appendages on the abdomen of the male :—

i. Gills trichobranchiæ (quadriserial) : the right vas deferens forms a *short* tube : a pair of appendages *may* be present on the first abdominal segment of the *female only* ... PAGURODES.

ii. Gills phyllobranchiæ (biserial) :—

a. Both vasa deferentia are protruded, the left is short, the right long :—

a. The long (right) vas deferens ends in a long filament : a pair of appendages on the first abdominal segment of the female *only* ... NEMATOPAGURUS.

b. The long (right) vas deferens is sabre-shaped : no paired appendages on the first abdominal segment of the female ... — *Catapaguroides*.

b. Only the right vas deferens protrudes : no paired appendages on the abdomen of the female :—

a. The right vas deferens recurves over the *right* flank on to the *dorsum* of the abdomen ... — CATAPAGURUS.

b. The right vas deferens crosses *beneath* the abdomen and then ascends over the *left* flank — CESTOPAGURUS.

c. Only the left vas deferens protrudes no paired appendages on the abdomen of the female :—

a. The left vas deferens is coiled in a spiral ... ... — SPIROPAGURUS.

b. Left vas deferens simply curved — ANAPAGURUS.

N. B.—Porcellanopagurus Filhol (for references see Appendix, *Table of Genera and Species*) seems to belong to the subfamily of *Eupagurinæ*.

PAGURINÆ, Ortmann.

PAGUROPSIS, Henderson.

Paguropsis, Henderson, Challenger Anomura, p. 98, 1888. Stebbing, Hist. Crust., 1893, p. 169.

Chlænopagurus, Alcock, J. A. S. B., LXVIII, 1899, pt. 2, p. 113, and Cat. Indian Deep-Sea Crust. Decap., p. 228.

Carapace moderately elongate, not depressed, the gastric and cardiac regions very strongly calcified, otherwise soft ; rostrum prominent (beak-like in the only species known).

The abdomen, except for the first two terga which are partly calcified and for the last tergum and telson which are properly calcified, is a soft bag, flexed but not spirally coiled, perfectly symmetrical in the male, but rendered unsymmetrical in the female by the presence of a large fleshy brood-pouch on one side only.

Eyestalks stout, ophthalmic scales widely separated, spiniform. Antennal acicle large, antennal flagellum long, non-setose.

The endopodite (palp) of the 1st pair of maxillæ is furnished with a recurved flagellum. The exopodites of all three pairs of maxillipeds have a well developed flagellum : the external maxillipeds are approximated at base.

The chelipeds are in all respects equal and similar, massive in both sexes, but more so in the male : the fingers, which end in corneous tips, open in a nearly horizontal plane.

The crawling-legs (2nd and 3rd pairs) are long and stout, particularly as to the dactyli. The 4th pair of legs end in particularly perfect chelæ, the 5th pair are also chelate : there is an inconspicuous patch of small corneous granules near the tip of the 5th pair of legs, but none at all on the chelæ of the 4th pair.

In the male the first two abdominal somites carry each a pair of uniramous appendages modified for sexual purposes ; and the 3rd, 4th and 5th somites carry on one side only—*right or left*—each a minute biramous appendage with the endopodite quite rudimentary.

In the female the first abdominal somite carries a pair of small uniramous appendages: the appendages of the next four somites (2nd-5th) are present on one side only—*right or left;* the first three of them are biramous, slender but of good size, for carrying the eggs, and are contained within a capacious cup-like brood-pouch formed by a fleshy lobe that springs from the side of the 5th somite; the fourth of them is a tiny biramous appendage not enclosed in the brood-pouch.

In both sexes the appendages of the 6th somite are symmetrical biramous swimmerets placed symmetrically on either side of the symmetrical telson: their rami are slender and falciform, the inner one being much reduced in size: an inconspicuous patch of corneous granules exists on the outer surface of the inner ramus, but is almost obsolete on the outer ramus.

There are 13 branchiæ on either side, somite XIV having no pleurobranch. Each gill consists of two series of leaflets, but each leaflet bears, near the tip, a pair of slender filaments.

The single known species of the genus does not inhabit a shell, but is protected by the coenosarc of a colony of commensal *Anthozoa*. It belongs to the sublittoral fauna of the Oriental Region.

Paguropsis is closely related to *Paguristes*, from which it differs in its short and stout eyestalks, its non-coiled abdomen and symmetrical tail-fan, its cheliform 4th pair of legs, and in the important fact that its unpaired abdominal appendages are still in an unsettled state. The stout eyestalks and large eyes may be regarded as an adaptation to the gloom of its habitat, and the straight abdomen and cheliform 4th pair of legs as an adaptation to its means of shelter, which does not necessitate any coiling, but does require a well-adjusted grip. The indifferent position of the unpaired abdominal appendages, however, can hardly be of any functional advantage, but may be rather supposed to be a persistent primitive tendency to asymmetry.

1. Paguropsis typica, Henderson, Plate II.

Paguropsis typicus, Henderson, Challenger Anomura, p. 99, pl. x., fig. 4, 1888.

Chlænopagurus andersoni, Alcock, J. A. S. B., LXVIII, pt. 2, 1899, p. 115, pl. i; and Illustrations of the Zoology of the Investigator, Crust., pl. liii, fig. 1, 2, and pl. liv, fig. 1; and Cat. Indian Deep-Sea Crust. Decap., p. 229.

The cervical groove is deep-cut, and the portion of the carapace that is included within it is strongly calcified. The triangular cardiac region is also fairly well calcified, especially in its anterior part. But all the rest of the carapace, except here and there along the outer edge of the cervical

groove, is quite soft and membranous. The hepatic region is marked off from the branchial region by a transverse furrow.

The front, which is carinated dorsally and deflexed at tip, projects well between the eyestalks.

The eyes are large and reniform and are borne on stout stalks, which are about half the length of the anterior border of the carapace.

The first two joints of the antennulary peduncle are together about the same length as the eyestalk, the first joint being flattened and somewhat dilated dorsally; the third joint, which is the longest, is not two-thirds the length of the upper flagellum.

The antennal peduncle is about the same length as that of the antennules: the acicle is about as long as the eyestalk: the flagellum is about twice the length of the carapace.

The chelipeds are massive, quite equal, and about as long as the entire body with the abdomen flexed in the natural position: not much more than a third of their length is formed by the merus, which is slightly shorter than the hand. They are more or less covered with long, stiff, golden-yellow bristles, which are specially thick-set on the under surface of the merus and the outer surface of the wrist and hand: these bristles do not hide the rather coarse squamiform tubercles from which they spring. There are some coarsish spines along the inner border of the ischium, both the lower borders of the merus, and on a good part of the outer surface of the wrist and hand. The fingers are spooned and have minutely corneous tips.

The legs are stout and compressed, and their borders—and in the case of the last three joints of the first two pairs, a considerable part of the surface also—are more or less covered with stiff yellow bristles like those that grow on the chelipeds. The first pair of legs are of equal length with the chelipeds. The second pair are a little longer, and a third of their length is formed by the long sabre-shaped dactylus. The third pair do not reach to the far end of the carpus of the second pair: they terminate in a very perfect chela of comparatively large size, with the dactylus anterior (or dorsal) and the fixed finger strongly and sharply toothed. The fourth pair reach just beyond the far end of the merus of the third pair: they end in a very much smaller and less perfect chela, with the dactylus posterior (or ventral).

The abdomen is a perfectly soft membranous bag, of which the segmentation is quite recognizably, but far from conspicuously, defined. In the male it is symmetrical, though the minute or rudimentary appendages, that are present on one side (right *or* left) of the 3rd, 4th and 5th segments, are represented on the other side only by small tufts of small bristles. In the

female its symmetry is lost by the presence, on one side or other, of a large membranous leaf-like lobe that forms a capacious cup-like brood-pouch.

The first two pairs of abdominal appendages of the male end in convoluted plates, the second pair working in the grooves formed by the first pair.

The telson is quite symmetrical, and lies in the middle line, tucked up against the ventral surface of the abdomen. On either side of it are the quite symmetrical swimmerets of the sixth pair: the basipodite of these has a spine at its posterior angle: both the exopodite and endopodite are narrow, slender and falciform, with the anterior edge serrated and the tip spiniform: the exopodite is many times larger than the endopodite.

The animal does not inhabit a shell, but is protected by a soft fleshy cœnosarc of a colony of Actiniarian polyps. This forms a sort of sheet or blanket, one end of which is tucked round the telson of the crab and is firmly held by the hook-like swimmerets of the 6th abdominal somite and by the folded-in telson, while the corners of the other end are firmly grasped by the chelæ of the penultimate thoracic appendages in such a way that the sheet can be drawn right over the back of the crab as far as the eyes.

The colour of the crab is red: the cœnosarc of the polyp-colony is bluish, the polyps themselves are dark purple.

A large male, lying in the natural position with the telson bent under, measures, from the tip of the rostrum, 63 millim.; and the chelipeds of the same individual, measured along their convex curve, are 68 millim. in length.

An egg-laden female, measured in the same way, is 37 millim. long and has chelipeds 35 millim. long.

$\frac{3534-3537}{10}$, $\frac{3169-3189}{10}$.	Off Cape Comorin, 102 fathoms.	"Investigator."
$\frac{4659-60}{10}$.	Gulf of Martaban, 90 fathoms.	"Investigator."

Distribution: Philippines (Tablas I.), 100—115 fath., and as above.

Paguristes, Dana.

Paguristes, Dana, Proc. Acad. Nat. Sci. Philad. (1851), 1852, p. 269, and U.-S. Expl. Exp. Crust., pt. I, p. 436, 1852: Stimpson, Proc. Ac. Nat. Sci. Philad. (1858), 1859, p. 235: Heller, Crust. sudl. Europ., 1863, p. 172: Boas, Vid. Selsk. Skr., 6 Række, nat. o. math. I, 2, 1880, p. 189: Henderson, Challenger Anomura, 1888, p. 77: Milne Edwards & Bouvier, Mem. Mus. Comp. Zool. Harvard, XIV. 3, 1893, p. 32; Ortmann in Bronn's Thier-Reich, Malacostraca, p. 1146: Thomson, Trans. N. Z. Inst., 1898, p. 186: Holmes, Occas. Papers Calif. Acad. Sci., VII., 1900, p. 151: Young, Stalk-eyed Crust. W. I., p. 376: Benedict, Bull. U. S. Fish. Comm. XX, 2, p. 143.

Carapace elongate, broadened posteriorly, strongly calcified in front of the cervical groove and in the neighbourhood of the cardiac region. Rostrum usually well developed.

Abdomen well developed, soft, spirally coiled, with the terga widely separated and—except the first, the last, and the telson—often ill-calcified.

Eyestalks long and usually slender; ophthalmic scales well formed, usually spiniform and widely separated. Antennal acicle well formed: antennal flagellum either of moderate length or short, usually setose.

The external maxillipeds are approximated at base: the exopodites of all three pairs of maxillipeds have a well developed flagellum: the endopodite (palp) of the first maxillæ has a recurved flagellum.

Chelipeds similar, equal, subequal, or one (usually the left) may be larger than the other: the fingers open and shut in a horizontal plane: the finger tips are corneous (usually), or calcareous.

4th pair of legs not cheliform, the dactylus being terminal: 5th pair cheliform: a patch of imbricating corneous granules is present on the outer surface of the tips of both pairs.

In the male the first two abdominal somites carry each a pair of uniramous appendages modified for sexual purposes; and the next three somites carry, on the left side, each a small appendage of which one ramus is rudimentary.

In the female the first abdominal somite carries a pair of uniramous appendages: the next three somites carry, on the left side, each a biramous appendage; and the fifth somite has, on the same side, a small appendage similar to that of the male. In the female also there springs from the left side of the 4th somite a fleshy foliaceous lobe that more or less overlaps the 3 appendages in front of it and forms a brood-pouch.

In both sexes the telson is lop-sided to the left, and the appendages of the 6th somite (tail-fan) are better developed on the left side than on the right: both the rami of these appendages have, on their outer surface, a patch of imbricating corneous granules.

The gills are phyllobranchiæ, and their number and disposition is the same as in *Paguropsis*.

The species of this large genus are found in the subtropical and warmer temperate seas, and in the cool sublittoral waters of tropical seas (of which last habitation they seem, in fact, to be characteristic) all round the globe.

In the *Atlantic*, they are fairly numerous on the American side, in the sublittoral zones (35-350 fath.) of the West Indies and Spanish Main, from about 25° N. to about 8° S.; and on the European side they are scattered

from about 43° N. (Finisterre) to Liberia, one species also occurring in most parts of the Mediterranean, and only *one* species extending into the S. Atlantic (Cape of Good Hope).

In the *Indo-Pacific* 23 species (more than half the total number known) are found between the southern end of the Red Sea—eastwards through the cool sublittoral depths of the seas of India—and Japan and New Zealand, their range of latitude being here from about 40° N. to about 40° S.

In the *Western Pacific* 7 or 8 species are known from the coast of N. & S. America, between the parallels of 47° 30′ N. (Puget Sound) and 41° S. (Llanquihue).

Those who are interested, in a general way, in the question of the affinities and antecedents of the deep-sea Crustacean fauna will be struck by the fact that over 30 *per cent.* of the species of this primitive genus of *Paguridæ* come from depths of 100 fathoms and more; and in this respect the bathymetrical distribution of *Paguristes* recalls that of certain other primitive groups of Anomura and Brachyura, *e. g.*, the *Pylochelidæ* and the *Homolidæ* and *Dromidæ*. While those who are concerned to interpret the affinities of the sublittoral fauna of Indian seas may find suggestive material in the fact that the largest and most prolific Indian species, *P. balanophilus*, is hardly to be distinguished from the Mediterranean *P. oculatus*.

Key to the Indian species of the genus Paguristes.

I. Antennal flagellum considerably longer than the carapace: the fingers of the chelipeds meet quite closely throughout their length:—

- *A.* Eyestalks longer than the antennular peduncle:—
  - i. Chelipeds not hirsute or tomentose:—
    - 1. Rostrum long and slender; eyestalks slender ... *P. balanophilus.*
    - 2. Rostrum short, broadly triangular: eyestalks stout *P. mundus.*
  - ii. Chelipeds densely tomentose ... — ... *P. ciliatus.*
- *B.* Eyestalks shorter than the antennular peduncle — ... *P. calvus.*

II. Antennal flagellum shorter than the carapace:—

- *A.* The fingers when closed are in close contact throughout their length: chelipeds not hirsute:—
  - i. Outer surface of carpus and hand of chelipeds closely covered with flat, scale-like, imbricating, ciliated tubercles ... — — ... *P. longirostris.*
  - ii. Outer surface of carpus and hand of chelipeds crisply granular ... — — .. *P. pusillus.*
- *B.* The fingers when closed leave a gap between their bases: chelipeds beset with long bristles, or with matted setae, on the carpus and hand:—
  - i. Antennal flagellum nearly as long as the carapace ... *P. puniceus.*
  - ii. Antennal flagellum hardly half as long as the carapace:—
    - *a.* Eyestalks longer than the antennular peduncle ... *P. hians.*
    - *b.* Eyestalks shorter than the antennular peduncle — *P. incomitatus.*

1. Paguristes balanophilus, n. sp. Plate III., fig. 1.

Carapace non-setose, its breadth across the branchial regions about three-fifths its length in the middle line. The slender rostrum reaches well beyond the middle of the ophthalmic scales.

Eyestalks slender, slightly longer than the front border of the carapace and considerably longer than the antennular peduncle. Ophthalmic scales large, bifid or trifid at tip.

Antennal acicle slightly setose, strongly spinose, reaching nearly half-way along the terminal joint of the peduncle: flagellum decidedly longer than the carapace.

The left cheliped, the length of which is about twice that of the carapace measured in the middle line, is somewhat the larger, especially in respect of the hand, but except that the inner edge of the right carpus is spinose, both chelipeds are alike in sculpture. A close but fine and very short tomentum, not in any way obscuring the surface sculpture, more or less covers the under surface and distal end of the merus, and the upper surface of the carpus and hand: the under and outer surfaces of the merus are granular, and there are some transverse rows of spinules along the upper border of this joint at its distal end: the exposed surfaces of the carpus are closely covered with sub-spiniform granules and tubercles, and those of the hand and fingers with small muricated or crystalloid tubercles having in places almost a squamiform appearance: the cutting edges of the fingers are straight and entire, and meet closely along their whole length.

The 2nd and 3rd legs of the left side do not reach to, while those of the right side reach well beyond, the tips of the chelipeds: in the 2nd pair the posterior border of the merus and the anterior border of the three terminal joints are setose, and in the case of the carpus and propodite strongly spinose, the dactylus being only spinulose: in the 3rd pair the setæ are very much less noticeable, except on the dactylus, and distinct spines are present only on the anterior border of the carpus. Some subsquamiform markings are present on the inner surface of the two terminal joints of both these legs.

Length of carapace 20 millim. Colours in spirit; pinkish white; a well defined orange patch in a violet field on both inner and outer surfaces of merus of chelipeds—most distinct on the inner surface. Eggs large, well covered by the brood-pouch.

Found in wide-mouthed shells of many kinds, the shells encrusted with *Actiniæ* and *Epizoanthus* and *Capulus*, and particularly with *Balanidæ*.

2644—59/10.	Off the Andamans, 55 fath.	—	—	—	"Investigator."
4239/10.	Off the Andamans, 53 fath.	—	—	—	
4248/10.	Off the Andamans, 60 fath.	—	—	—	
4310/10.	Off Bombay, 56-58 fath.	—	—	—	

This species is extremely near-related to the Atlantic and Mediterranean *P. oculatus*, of which, indeed, it may almost be regarded as a variety.

2. Paguristes ?ciliatus, Heller.

Paguristes ciliatus, Heller, Verh. zool.-bot. Ges. Wien, XII., 1862, p. 525, and Novara Crust., p. 91, pl. vii., fig. 6, 1865.

The single male specimen in the Indian Museum which I identify with *P. ciliatus* agrees with *P. balanophilus* in all but the following characters :—

Inside the antero-lateral border of the carapace there are, in places, some setæ.

The rostrum reaches only to the middle of the ophthalmic scales, which though acuminate are rather short. The antennal scale is much more setose than in *P. balanophilus*.

The outer surface of the wrist, palm, and fixed finger are so densely tomentose that their sculpture is quite hidden : when denuded the surface is closely covered with small acuminate tubercles, which are not at all compound or "crystalloid." Again the tubercles, or spines, along the inner edge of the wrist are much larger and more acute than in *P. balanophilus*, and have a dark-coloured tip.

The 2nd and 3rd legs are tomentose, densely so on the borders, especially the anterior border, of the last three joints ; and the subsquamiform markings on the inner surface of the propodite and dactylus are represented by irregularities and small tufts of short setæ. Again, the legs of the left side slightly surpass the left cheliped.

Heller says nothing about the colouring ; but in our specimen it resembles that of *P. balanophilus*, except that the anterior part of the carapace is mottled red.

4725/10.	Persian Gulf, 48-49 fath.	"Investigator."

3. Paguristes calvus, n. sp. Plate I., fig. 4.

This species is even less setose than *P. balanophilus*, for except on the anterior border of the dactyli of the 2nd and 3rd legs, there are no setæ sufficiently long or numerous to be seen with the naked eye.

Rostrum long and slender, as in *P. balanophilus*, and reaching well beyond the middle of the ophthalmic scales.

Eyestalks just shorter than the front border of the carapace, decidedly shorter than the antennular peduncle, stoutish, eyes largish. Ophthalmic scales large, acute.

Antennal acicle stout, spinose, reaching about half-way along the terminal joint of the peduncle. Antennal flagellum peculiarly stout and stiff, about 1⅔ times as long as the carapace.

The left cheliped is slightly the larger, its length being about half again that of the carapace measured in the middle line; but both chelipeds are similar in general form and sculpture: the upper border of the merus is spinose distally; the exposed surfaces of the carpus, hand, and fingers are closely and crisply granular or spinulose, the inner border of all three joints (in one or both chelipeds) being sharply serrated. The cutting edges of the fingers are straight and entire, and meet closely throughout their length.

The 2nd and 3rd pairs of legs are long, and on both sides reach beyond the chelipeds: in the 2nd pair the anterior border of the carpus and propodite is strongly spinose, and that of the dactylus spinulose: in both pairs long, fine, stiff setæ fringe the anterior border of the dactylus.

Length of carapace 18 millim. Colours in spirit: uniform yellowish: a network of faint red lines on the inner surface of the merus of the chelipeds. Inhabiting clean and incrusted shells of *Murex* and *Pleurotoma*.

$\frac{4701—5}{10}$. Northern part of B. of Bengal, 65 fath, "Investigator."

This species is closely related to *P. balanophilus*, from which it chiefly differs in the shorter and stouter eyestalks, the longer and stouter antennal flagellum, and the absence of conspicuous setæ everywhere, except on the dactyli of the 2nd and 3rd legs.

4. Paguristes mundus, n. sp. Plate III., fig. 5.

In this species also conspicuous setæ are present only on the dactyli of the 2nd and 3rd legs.

Carapace elongate, its breadth across the branchial regions considerably less than two-thirds its length in the middle line. Rostrum broadly triangular,

just surpassing the antennal angles of the carapace, but not reaching to the middle of the ophthalmic scales.

Eyestalks decidedly stout, just longer than the front border of the carapace and than the antennular peduncle. Eyes large.

Antennal acicle spinose, reaching to the anterior fourth of the terminal joint of the peduncle: antennal flagellum just longer than the carapace.

Chelipeds subequal, rather slender, about half again as long as the carapace measured in the middle line: the upper border of the merus, and the inner border of the wrist and hand and finger are spinose: the exposed surfaces of the wrist, hand and fingers are closely covered with coarse but acute spinules, which have a sinuous-linear arrangement on the wrist. The cutting edges of the fingers are quite straight, and meet closely throughout their length.

The 2nd and 3rd legs on both sides reach beyond the chelipeds; the anterior border of the carpus and propodite of the 2nd pair is strongly spinose; the lower border of the elongate dactylus of both pairs is evenly and elegantly fringed with capillary spinelets.

Length of carapace 10 millim. Colours in spirit: yellow, eyestalks pinkish.

Inhabiting clean shells of *Xenophora pallidula*.

$\frac{4246}{10}$. Off Port Blair, Andamans, 112 fath. "Investigator."

5. Paguristes longirostris, Dana. Plate I., fig. 5.

Paguristes longirostris, Dana, Proc. Ac. Nat. Sci. Philad. (1851), 1852, p. 271; and U. S. Expl. Exp. Crust., pt. I., p. 436, pl. xxviii, fig. 1 *a*, *b*: Nobili, Boll. Mus. Zool. Torino, XVIII, 1903, No. 445, p. 20.

Carapace nearly naked, its breadth across the branchial regions about two-thirds its length in the middle line. The rostrum, which is deflexed, reaches to the middle of the ophthalmic scales.

Eyestalks moderately slender, considerably longer than the anterior border of the carapace and than the antennular peduncle. Ophthalmic scales spinulose at tip, on the inner side.

Antennal acicle spinose and setose, reaching beyond the middle of the terminal joint of the peduncle: the flagellum is less than three-fourths the length of the carapace.

Chelipeds subequal, or one (right or left) may be very slightly larger as to the wrist and hand: the anterior border of the merus and the inner border of the wrist are spinose: the whole of the exposed (extensor) surface of the wrist, hand and fingers is covered with flat, scale-like, imbricating

tubercles, the free edge of which is evenly fringed with very short cilia, as in *Pagurus imbricatus*. The cutting edges of the fingers are quite straight, and meet closely throughout their length.

The 2nd and 3rd legs on the left side reach slightly beyond, those on the right side more than half a dactylus-length beyond, the chelipeds; their edges, especially those of the 2nd pair, are setose: in the 2nd pair, the anterior border of the carpus and propodite are strongly spinose, the same parts of the 3rd pair being inconspicuously spinulose: in both pairs the inner surface of the two terminal joints has some squamiform markings somewhat like those on the outer surface of the hands.

Colours in spirit: dirty pinkish white, the cilia that define the scale-like tubercles of the chelipeds, brown. Length of carapace, 12 millim.

$\frac{1724}{7}$.	Off Ganjam coast, 28 fath.	"Investigator."
$\frac{1728}{7}$.	Off Vizagapatam coast, 15—17 fath. ... — ...	
$\frac{2740}{7}$.	Off Arakan coast, 7 fath. ... —	

Dana's specimen was from the "East Indies." Our specimens are in shells of *Rana* and *Pleurotoma* shared each by a sea-anemone.

6. Paguristes pusillus, Henderson. Plate III., fig. 3.

Paguristes pusillus, Henderson, Journ. As. Soc. Bengal, LXV., 1896, pt. 2, p. 526.

Illustrations of the Zool. "Investigator", Crust., pl. xxxi., fig. 4, 4*a*.

Except on the edges of the 2nd pair of legs and on the dactylus of the 3rd pair, there are no conspicuous setæ in this species.

Carapace elongate, its greatest breadth about two-thirds its length in the middle line. The rostrum reaches well beyond the middle of the ophthalmic scales.

Eyestalks moderately stout but very long, reaching nearly to the end of the antennular flagella.

Antennal acicle spinose, reaching nearly to the end of the peduncle: flagellum about two-thirds the length of the carapace.

Chelipeds similar, subequal or the left very slightly the larger, their length about half again that of the carapace. The exposed (extensor) surface of wrist, hand and fingers is very closely beset with sharp granules, which on the inner edge of the wrist and hand become strong teeth. The cutting edges of the fingers are quite straight, and meet throughout their length.

The 2nd and 3rd pairs of legs of the left side hardly reach to, those of the right side only just surpass, the tips of the chelipeds: strong spines are present on the anterior border of the carpus and propodite of the 2nd pair.

Colours in spirit: pinkish white; very faint red crossbands on the legs; on the inner surface of the merus of the chelipeds there is a well defined white patch on a faint pink ground. Length of carapace 7-8 millim.

The eggs are of relatively enormous size, their major diameter being 1·25 millim., and their minor diameter, 1 millim.

$\frac{1120}{10}$. Off N. E. coast of Ceylon, 28 fath. "Investigator."

7. Paguristes puniceus, Henderson. Plate III., fig. 6.

Paguristes puniceus, Henderson, J. A. S. B., LXV., 1896, pt. 2, p. 527. Illustrations Zool. Investigator, Crust., pl. xxxii., fig. 1.

Carapace non-setose, its breadth across the branchial regions about two-thirds its length in the middle line. The rostrum is triangular and barely reaches the middle of the ophthalmic scales.

Eyestalks slender, less than three-fourths the length of the front border of the carapace, hardly reaching the middle of the terminal joint of the antennular peduncle. The tip of the ophthalmic scales is entire or obscurely bifid.

Antennal acicle spinose and setose, reaching to the middle third of the terminal joint of the peduncle: the flagellum not quite as long as the carapace.

Chelipeds similar and subequal, about half again as long as the carapace, rather thickly beset with fine, long, yellow bristles: the edges of the merus are serrulate; on the outer surface of the carpus there are three longitudinal rows of strong spines, of which the innermost row are the largest; there are several rows of similar spines on the hand, of which the innermost row are largest, and the edges of the fingers are serrated. When the fingers are closed there is a decided gap between their bases.

The 2nd and 3rd pairs of legs are long, on both sides exceeding the chelipeds by about a dactylus length: their edges, especially those of the 2nd pair, are fringed with long, yellow bristles, and the anterior border of the carpus and propodite of the 2nd pair is strongly spinose.

Colours in spirit, pinkish white. Length of carapace 17-18 millim.

$\frac{4219}{7}$.	Off Madras coast, 133 fath. ...	...	"Investigator."
$\frac{4223}{7}$: $\frac{1017\text{-}26}{10}$.	Off Madras coast, 145-250 fath. ...	...	
$\frac{2614}{10}$.	Andaman Sea, 370-419 fath. —	—	
$\frac{3894}{10}$.	Off Travancore coast, 224-284 fath.	—	

The species inhabits wide-mouthed shells of various kinds, which may be either quite clean, or incrusted with *Epizoanthus*, *Balanidæ*, and *Capulus*.

8. Paguristes incomitatus, n. sp. Plate III., fig. 4.

The carapace in front of the cervical groove is tomentose, the hairs, which are not long, being matted into little tufts with sand and mud. The edges of the ophthalmic scales, of the antennal acicle and peduncle, and of the 2nd and 3rd pairs of legs, and the outer surfaces of the wrist, hand and fingers of the chelipeds are beset with long matted setæ.

Carapace elongate, its breadth across the branchial regions being about five-eighths of its length. Rostrum broad, triangular, very short, hardly reaching the base of the ophthalmic scales, and not nearly so prominent as the antennal angles of the carapace, which though broad are acute.

Eyestalks very slender, but considerably shorter than the front border of the carapace and than the antennular peduncles. Ophthalmic scales bifid at tip

Antennal acicle narrow-foliaceous, not reaching half-way along the terminal joint of the peduncle, fringed with very long setæ, but not spinose: antennal flagellum less than half as long as the carapace.

Chelipeds subequal, their length more than half again as much as that of the carapace, their sculpture is much disguised by the matted setæ that are attached to their edges and spines. When denuded a conspicuous row of strong spines is found along the inner border of the carpus and propodite, and running some way along the same border of the dactylus ; a second row of much smaller spinules or granules runs along the outer surface of the carpus and propodite ; and a third row of granules runs along the lower part of the outer surface of the propodite, and is continued along the fixed finger: there are also a few other granules on the outer surface of the propodite. Before denudation, owing to the presence of matted setæ on all the prominences of the carpus and propodite, the upper surface of these joints has an excavated or honey-combed appearance. The fingers when closed leave a gap at the base.

The 2nd and 3rd pairs of legs on both sides reach beyond the tips of the chelipeds: the anterior edge of the carpus and propodite of the 2nd pair is spinose.

Colours in spirit: yellowish brown or yellow: when they are denuded of setæ, copious pink markings are seen on the carapace, chelipeds and legs.

Length of carapace 8 millim. The eggs are relatively large, their major diameter being three-fourths of a millimetre.

$\frac{4238}{10}$; $\frac{4241\cdot4}{10}$.	N. W. of Calicut, 100 fath.	"Investigator."

This species, which is closely related to *P. hians*, inhabits perfectly clean shells of *Nassaria coromandelica*.

9. Paguristes hians, Henderson. Plate III., fig. 2.

Paguristes hians, Henderson, Challenger Anomura, 1888, p. 79, pl. viii., fig. 4.

This little species very closely resembles *P. incomitatus* at all points, but differs in the following particulars:—

The carapace is less elongate, its breadth across the branchial regions being about four-fifths of its length; it is also less tomentose, and its antennal angles are not acute.

The eyestalks are very much longer: they are longer than the front border of the carapace and than the antennular peduncles.

The antennal acicle is not so broad, and even when the setæ are not removed it can be seen to be spinose on both borders.

In the chelipeds the spines along the inner border of the carpus and propodite are coarser, and there are some spinules on the upper border of the merus at its far end.

$\frac{1855—6}{7}$	Off Ganjam coast, 15—25 fath.	"Investigator."
$\frac{5755}{9}$	Off Malabar coast, 28 fath.	

Distribution: Arabian S., B. of Bengal, Philippines.

Clibanarius, Dana.

Clibanarius, Dana, U. S. Expl. Exp., Crust., pt. I., p. 461, 1852: Stimpson, Proc. Ac. Nat. Sci. Philad. (1858) 1859, p. 234: Heller, Crust. sudl. Europ., 1863, p. 177; Miers, Crust. New Zealand, 1876, p. 67: Haswell, Cat. Austral. Crust., 1882, p. 159: Henderson,

Challenger Anomura, 1888, p. 60 : Milne Edwards and Bouvier, Mem. Mus. Comp. Zool. Harvard, XIV. 3, 1893, p. 156: Stebbing, Hist. Crust. 1893, p. 160: Ortmann in Bronn's Thier Reich, Malacostraca, p. 1146: Thomson, Trans N. Z. Inst., (1898) 1899, p. 171: Young, Stalk-eyed Crust. West Indies, 1900, p. 363.

Carapace elongate, broadened posteriorly, well calcified in front of the cervical groove and in the neighbourhood of the cardiac region. Rostrum distinct, but short.

Abdomen well developed, soft, spirally coiled, with the terga widely separated.

Eyestalks long and slender: ophthalmic scales of good size, almost always closely approximated. Antennal acicle usually short: antennal flagellum long, non-setose.

External maxillipeds approximated at base. The exopodites of all three pairs of maxillipeds have a well-developed flagellum. The endopodite (palp) of the first maxillæ has a recurved flagellum.

Chelipeds similar, equal or subequal, or one may be slightly larger than the other: the fingers open and shut in a horizontal plane, their tips are corneous and a good deal spooned.

4th pair of legs subcheliform, the 5th pair cheliform: both have, on the outer surface, near the tip, a patch of imbricating corneous granules.

Except for the appendages which form the tail-fan, there are no *paired* appendages in either sex. In both sexes, on the left side, an unequally-biramous appendage is found on the 2nd, 3rd, 4th, and 5th somites. The tail-fan, in all its parts, is more developed on the left side than on the right. A patch of imbricating corneous granules exists, as usual, on the dorsal surface of both rami of the swimmerets.

The gills are phyllobranchiæ, and in number and disposition are as in *Paguropsis* and *Paguristes*.

Clibanarius differs from *Paguristes* in the following particulars:—the rostrum is, usually, less prominent; the ophthalmic scales are, usually, almost in contact; the 4th pair of legs are subcheliform; there are no *paired* appendages on the anterior abdominal segments in either sex; and the rami of the unpaired abdominal appendages are less unequal.

The species of this large genus are found in tropical seas—ranging also to a certain extent into temperate waters—all round the globe.

About half the species known inhabit the Indo-Pacific, from the Red Sea and E. coast of Africa to the Sandwich Is. Five species occur on the Western Pacific coast, from Vancouver I. (about 50° N.) to Ecuador.

In the West Indies and neighbouring Atlantic coasts, from North Carolina to Rio Janeiro (about 35° N. to about 23° S.), 9 or 10 species have been found.

Six species are known from the coast and neighbouring islands of N. W. Africa, two of these West-African species also having a very extended range eastwards through Indian and Malaysian seas into the Pacific. The genus is also represented in the Mediterranean.

The distribution of *Clibanarius* is very like that of *Paguristes*, with this great difference, that whereas *Paguristes* has a tendency (especially in the tropics) to emigrate into the deep sea, *Clibanarius* holds its own as a littoral genus and even shows a tendency to ascend into brackish waters, one species being met with not far from Calcutta. As far as I can ascertain, only two species of *Clibanarius* have been found below the 100-fathom line; and it is a singular fact that although these two species agree with one another in two important characters (distant ophthalmic scales, and abnormal development of 4th abdominal appendage of female) that distinguish them from all other *Clibanarii*, one comes from the West Indies and the other from off the Malabar coast.

Key to the Indian species of Clibanarius.

I. The dactylus of the 3rd pair of thoracic legs (2nd pair of crawling legs) is decidedly longer than the propodite :—

A. Eyestalks much shorter than the antennular peduncles :—

i. Inner lower border of merus of chelipeds simply serrulate ... ... *C. clibanarius.*

ii. A strong tooth at the near end of the lower inner border of the merus of the chelipeds ... *C. infraspinatus.*

B. Eyestalks as long as the antennular peduncle :—

i. Eyestalks much longer than the anterior border of the carapace, the eyes occupying about one-eleventh of their length ... ... *C. padavensis.*

ii. Eyestalks equal in length to the anterior border of the carapace, the eyes occupying about one-eighth of their length ... ... *C. striolatus.*

II. The dactylus of the 3rd pair of thoracic legs, though it looks shorter, is exactly the same length as the propodite :—

A. Ophthalmic scales, as usual, almost in contact :—

i. Chelipeds, legs, and anterior part of carapace red, with a profusion of white spots ... ... *C. cruentatus.*

ii. Chelipeds, etc., deep red, without spots ... *C. arethusa.*

B. Ophthalmic scales widely separated : chelipeds and legs red with broad white cross-bands ... ... *C. albicinctus.*

III. The dactylus of the 3rd pair of thoracic legs is decidedly shorter than the propodite, which on the left side has its outer surface remarkably flattened and the upper border of that surface very sharply defined :—

A. Carapace not abnormally elongate : chelipeds and legs not remarkably setose :—

i. Eyestalks as long as the anterior border of the carapace or as the antennular peduncles ... *C. æquabilis.*

ii. Eyestalks shorter than the anterior border of the carapace or than the antennular peduncles ... *C. humilis.*

B. Carapace remarkably elongate ; chelipeds and legs thickly and coarsely hirsute, especially the flattened outer surface of the propodite of the 3rd left thoracic leg ... *C. corallinus.*

According to Heller and Nobili (see Table in the Appendix), *C. longitarsus*, De Haan, is found at the Nicobars and at Pondicherry. This species is very closely related to *C. padavensis.*

1. Clibanarius clibanarius, Herbst, Plate IV., fig. 1.

Cancer clibanarius, Herbst, Krabben, II. i, 1791, p. 20, pl. xxiii., fig. 1.

Pagurus clibanarius, Bosc, Hist. Nat. Crust., II., 1802, p. 75 : Latreille, Hist. Nat. Crust. VI., 1803, p. 167 : Olivier, Encycl. Method. VIII., 1811, p. 647 : Milne Edwards, Ann. Sci. Nat. Zool. (2) VI., 1836, p 276, and (3) X., 1848, p. 62 ; and Hist. Nat. Crust. II., 1837, p. 227 : Krauss, Sudafr. Crust., 1843, p. 56.

Clibanarius clibanarius, Hilgendorf, MB. k. Akad. Berlin, 1878, p. 820 : Henderson, Tr. Linn. Soc., Zool., (2) V., 1893, p. 423 : Mary Rathbun, P. U. S. Nat. Mus., 1900, p. 306.

Clibanarius vulgaris, Dana, U. S. Expl. Exp., Crust., pt. I, p. 462 ; Stimpson, Proc. Acad. Nat. Sci. Philad., 1858, p. 247 : Miers, Ann. Mag. Nat. Hist. (5) V., 1880, p. 375 ; Ozorio, Jorn. Acad. Lisb. XI., 1887, p. 228 : Walker, Journ. Linn. Soc., Zool., XX., 1887, p. 112 ; de Man, Notes Leyden Mus, XII., 1890, p. 112 (*nec syn.*) : Thallwitz, Abh. Zool. Mus. Dresden, 1890-91, No. 3, p. 33

Carapace with scattered tufts of long yellow bristles, which are most numerous near the lateral borders ; its greatest breadth about three-fourths its length in the middle line. Rostrum small, hardly reaching to the base of the ophthalmic scales, and hardly projecting beyond the antennal angles of the carapace.

Eyestalks long and slender, as long as the anterior border of the carapace or as the antennal peduncle, but reaching little more than half-way along the terminal joint of the antennular peduncle : they as well as the antennular and antennal peduncles are beset with tufts of long yellow bristles : ophthalmic scales with the free edge spinose and setose, approximated.

Antennal acicle setose and spinose, overlapping the base of the terminal joint of the peduncle : flagellum longer than the carapace.

Chelipeds equal and similar, in length about 1⅔ times that of the carapace, very much more massive than the legs: the merus has a few vesiculous tubercles on its outer and under surfaces, and its upper and inner borders are merely serrulate: the wrist and hand have the inner border strongly and coarsely serrate, and the extensor surfaces—as of the fingers also—closely beset with conical tubercles or coarse spines, on most of which a tuft of bristles is placed, the bristles being most conspicuous on the fingers: there is a gap between the bases of the closed fingers.

The 2nd and 3rd pairs of legs just reach beyond the chelipeds: their surface is more or less broken, but not distinctly tuberculous, and they are beset with tufts of bristles which are longest and thickest on the dactyli: the dactyli are from 1⅓ to 1½ times as long as their propodites, which are all subcylindrical.

Colours in spirit: reddish brown or reddish yellow, fingers of chelipeds maroon; some very faint lighter longitudinal lines on eyestalks and legs.

Length of carapace 46 millim.

1548	Pondicherry.	Purchased.
7922/9	Mouth of Hooghly.	Pilots' Brig.

Distribution: West and South-East coast of Africa, Bay of Bengal, Penang, Singapore, Gaspar Strait, Borneo, Hongkong.

2. Clibanarius infraspinatus, Hilgendorf.

Clibanarius infraspinatus, Hilgendorf in v. d. Decken's Reisen Ost Afr. III i 1869, p 97, footnote: de Man, Journ. Linn. Soc. Zool., XXII., 1888, p. 237: Ortmann, Zool. Jahrb., Syst., VI., 1892, p. 290: Henderson, Tr. Linn. Soc., Zool., (2) V., 1893, p. 423: Nobili, Boll. Mus. Torino, XVIII. No. 455, 1903, p. 19.

Clibanarius vulgaris (part.) de Man, Notes Leyden Mus. XII., 1890, p. 112.

Differs from *C. clibanarius* in having (1) a very strong tooth at the near end of the lower inner border of the merus of the chelipeds; and (2) the outer surface of the propodite of the 3rd left leg somewhat flatter; besides being of a lighter colour and very distinctly striped, in a longitudinal direction, on the eyestalks and legs.

Length of carapace 30 millim.

3161/5	Tavoy.	Museum Collector (24 specimens).
8104/6	Mergui.	Dr. J. Anderson.

Distribution: Red Sea eastwards to Sydney.

3. Clibanarius padavensis, de Man. Plate IV, fig. 2.

Clibanarius padavensis, de Man, Journ. Linn. Soc., Zool., XXII, 1888, p. 242, pl. xvi., fig. 1: Henderson, Tr. Linn. Soc., Zool., (2) V., 1893, p. 423, and Journ. A. S. B. LXV., 1896, pt. ii,

p. 520: Nobili, Ann. Mus. Civ. Genova, (2) XX., 1900, p. 493, and Boll. Mus. Torino, XVIII., No. 452, 1903, p. 15, No. 455, p. 20.

The greatest breadth of the carapace is about two-thirds the length in the middle line. Some fine silky setæ are present on the sides of the carapace, and on the antennal peduncles, and legs; but except on the wrist and hand, and on the dactyli of the 2nd and 3rd legs, they are not very noticeable.

Rostrum rather prominent, reaching to, or a little beyond, the base of the ophthalmic scales, and beyond the antennal angles of the carapace.

Eyestalks about one-sixth longer than the anterior border of the carapace, as long as the antennular peduncles: the eye occupies about one-eleventh of the length of the stalk. Ophthalmic scales approximated, their edge spinose.

Antennal acicle setose, very indistinctly serrulate, usually not overlapping the base of the terminal joint of the peduncle: flagellum nearly twice as long as the carapace.

Chelipeds equal and similar, slightly stouter than the legs, about 1 ¼ times as long as the carapace: merus with 1 or 2 spinules at the far end of the outer lower border: inner border of carpus indistinctly, and of propodite more distinctly, serrulate, the carpus having a distinct spine at the far end of the inner border: outer surface of the fingers studded with dark-tipped spinules, of which a few are also found at the far end of the upper and outer surface of the hand. Except for these, and for the little elevations from which the sparse setæ that beset the wrist and hand and fingers spring, the chelipeds are not armed. The fingers when closed are separated at the base by a gap.

The 2nd and 3rd legs exceed the chelipeds, on the left side by more than a dactylus, and on the right side by more than a dactylus and a half. The dactylus of the 2nd leg is barely longer than, that of the 3rd leg is about $1^2/_7$ times the length of, its propodite: the propodites of both pairs are subcylindrical.

Colours in spirit: yellow, with a series of straight red longitudinal lines on the eyestalks and 2nd and 3rd pairs of legs, and—though less distinct and slightly broken or sinuous—on the chelipeds.

Length of carapace 27 millim.

1853.	Port Canning, Hooghly Delta.	J. Wood-Mason (6).
$\frac{6745}{4}$. $\frac{6748}{4}$.	Mergui.	"Investigator."
$\frac{8103}{6}$.	Mergui.	Dr. J. Anderson.
$\frac{4318}{10}$.	Akyab.	W. Dodgson.

Distribution : coasts of Bay of Bengal and neighbourhood from S. India to Singapore : has a tendency to ascend into brackish waters, as is also shown by its commonly using brackish-water shells.

4. Clibanarius striolatus, Dana. Plate IV., fig. 7.

Clibanarius striolatus, Dana, U. S. Expl. Exp. Crust., pt. I., 1852, p. 463, pl. xxix, fig. 3*a*—*e*: Stimpson, Proc. Ac. Nat. Sci. Philad. (1858) 1859, p. 247 : Heller, Novara Crust., 1865, p. 89 : Richters, in Mobius, Meeresf. Maurit., 1880, p. 161 : Haswell, Cat. Austral. Crust., 1882, p. 159 : de Man, Archiv f. Nat. LIII., 1887, i., p. 445 : Bouvier, Bull. Soc. Philom. (8) IV., 1891-92, p. 53 : Ortmann, Zool. Jahrb., Syst., VI., 1892, p. 290 : Lanchester, P. Z. S., 1902, p. 365 : Nobili, Bull. Mus. Torino, XVIII, 1903, No. 455, p. 19.

This species and *C. padavensis* are closely related and very similar : it differs from *C. padavensis* in the following particulars :—

The rostrum is a little shorter and does not reach to the base of the ophthalmic scales.

The eyestalks are shorter and stouter, being only as long as the anterior border of the carapace ; and the eyes are larger, occupying from one-seventh to one-eighth of the length of the eyestalk.

The hands are shorter and stouter, and usually they and the wrists are rougher and more setose.

The propodite of the 3rd left leg has the upper border of its outer surface fairly well defined, and the dactylus of this pair of legs is a little shorter than in *C. padavensis*.

[1411.	Viti Levu (Fiji Is.)	Purchased.]
$\frac{6694}{3}$.	Karáchi.	Karáchi Museum.
$\frac{4344}{10}$.	Persian Gulf.	W. T. Blanford (10).
$\frac{4706}{10}$.	Trincomalee.	Dr. J. Anderson.
$\frac{4707}{10}$.	Mergui.	Dr. J. Anderson.

Distribution : G. of Aden and Seychelles eastwards to Tahiti : from about 43°E. eastwards to about 150° W , and from about 28° N. to about 18°S.

5. Clibanarius æquabilis, Dana.

Clibanarius æquabilis, Dana, U. S. Expl. Exp., Crust., pt. I., 1852, p. 464, pl. xxix., fig. 4 *a*—*f*; and Proc. Ac. Nat. Sci. Philad., 1854-55, p. 175 : Stimpson, Journ. Boston Soc. Nat. Hist., VI., 1857, p. 485; and Proc. Ac. Nat. Sci. Philad. (1858) 1859, p. 247 : Heller, Novara Crust., 1865, p. 91 : Borradaile, P. Z. S., 1898, p. 463 : Aurivillius, Bihang K. Svensk. Vetensk. Akad. Handl., XXIV., iv. 1, 1898, p. 12, pl. iv., fig. 8 : Mary Rathbun, P. U. S. N. M. XXII., 1900, p. 304.

Distribution : Madeira and W. Africa, (Ceylon, Mergui and Malay Peninsula) Society Is., Tahiti and Funafuti, California and Chili.

var. MERGUIENSIS, de Man. Plate IV., fig. 5.

Clibanarius æquabilis var. *merguiensis*, de Man, Journ. Linn. Soc., Zool., XXII., 1888, p. 247 : Lanchester, P.Z.S., 1902, p. 365.

Greatest breadth of carapace rather more than two-thirds the length in the middle line. Rostrum very short, not surpassing the antennal angles of the carapace.

Eyestalks as long as the anterior border of the carapace, and slightly longer than the antennular peduncles : ophthalmic scales large, with the free edge spinose, approximated.

The antennal acicle hardly overlaps the base of the terminal joint of the peduncle.

Chelipeds subequal, hardly longer than the carapace, a good deal stouter than the legs : the inner lower edge of the merus is elegantly serrulate : the upper surface of the wrist, hand, and fingers is more or less studded with conical spinules interspersed with setæ, the spinules being strongest along the inner edge of all three joints : there is a gap between the bases of the closed fingers.

The 2nd and 3rd legs reach beyond the chelipeds by considerably more than the length of their dactyli ; both are smooth, and sparsely setose. In the 2nd pair the dactylus is about two-thirds, and in the 3rd pair about five-sevenths, the length of the propodite. The propodite of the 3rd left leg has its outer surface remarkably flattened, and the upper border of that surface subcarinate. The dactylus of both pairs of legs, but especially that of the 3rd pair, is compressed

Colours in spirit : yellow, or pinkish-yellow, tips of fingers and claws of dactyli black.

Length of carapace about 9 millim.

$\frac{3159}{5}$.	Kyouk Phyoo.	"Investigator" (4).
$\frac{8101}{6}$. $\frac{8201}{6}$.	Mergui.	Dr. J. Anderson (20).
$\frac{1090}{10}$	Trincomalee.	"Investigator" (4).

This species is very like the Mediterranean *C. misanthropus*, from which it differs in being less setose.

6. CLIBANARIUS HUMILIS, Dana. Plate IV., fig. 6.

Clibanarius humilis, Dana, U. S. Expl. Exp. Crust., pt. I., 1852, p. 469, pl. xxix., fig. 9 : Heller, Novara Crust., 1865, p. 90.

This little species agrees in every particular with *C. æquabilis* (var. *merguiensis*), except that the eyestalks are much shorter, being not so long as the anterior border of the carapace, and considerably shorter than the antennular peduncles.

[1565.	Rarotonga (W. Pacific).	Purchased.]
1564.	Betra Par, Laccadives.	"Investigator."

A specimen is also in Mr. Stanley Gardiner's Maldive Islands collection.

Distribution : Laccadives and Maldives, Nicobars, Fiji Is., Tonga Is., Cook Is.

7. Clibanarius arethusa, de Man. Plate IV., fig. 3.

Clibanarius arethusa, de Man, Journ. Linn. Soc., Zool., XXII., 1888, p. 252 : Henderson, Tr. Linn. Soc., Zool., (2) V., 1893, p. 424.

This species, besides being much larger and differently coloured, differs from *C. æquabilis* (var. *merguiensis*) in the following particulars :—

There are numerous tufts of setæ on the gastric region, and in a transverse series behind the cervical groove.

The eyestalks are shorter than the antennular peduncles ; and the ophthalmic scales are narrow and pointed, and bifid at tip.

The antennal acicle and the basal joints of the peduncle are more setose.

There are fewer conical spinules on the hand and wrist ; indeed the only conspicuous spine on the wrist is one at the far end of the inner border.

The dactylus of the 2nd pair of legs is about five-sixths the length of its propodite, and that of the 3rd pair is exactly as long as its propodite.

Though the propodite of the 3rd left leg has its outer surface flattened and the upper border of that surface is well defined, it is not subcarinate.

Colours in spirit : carapace yellow ; eyestalks, antennal peduncles, chelipeds and legs deep orange-red (finger-tips and claws of dactyli black).

Length of carapace 30 millim.

$\frac{6753}{4}$.	Arakan coast.	"Investigator" (5).
$\frac{8102}{6}$.	Mergui.	Dr. J. Anderson.
$\frac{2676—7}{7}$.	Mergui.	"Investigator."

8. Clibanarius corallinus, Edw. Plate V., fig. 1.

Pagurus corallinus, Milne Edwards, Ann. Sci. Nat., Zool., (3) X., 1848, p. 63.

Pagurus globosomanus, Dana, Proc. Ac. Nat. Sci. Philad. (1851), 1852, p. 271 : *Clibanarius globosimanus*, Stimpson, Proc Ac. Nat. Sci. Philad. (1858), 1859, p. 247.

Clibanarius obesomanus (? *corallinus*) Dana, U. S. Expl. Exp. Crust., pt. I., 1852, p. 468, pl. xxix., fig. 8 *a—e*.

Cubanarus corallinus? Dana, *loc. cit.* : Heller, Novara Crust., 1865, p. 89 ; de Man, Archiv f. Nat. LIII., 1887, i., p. 447 ; Ortmann, Zool. Jahrb., Syst., VI., 1892, p. 292 : Borradaile, P.Z.S., 1898, p. 463 : Lanchester, P.Z.S., 1902, II., p. 365.

Carapace remarkably elongate, its greatest breadth hardly more than half its length in the middle line. The region in front of the cervical groove is very long, and its lateral borders are fringed with tufts of long stiff yellow and brown bristles. Similar bristles extend along the proximal half of the eyestalks, and the peduncles of both pairs of antennæ, and thickly beset the antennal acicle. Rostrum not more prominent than the antennal angles of the carapace.

Eyestalks slender, longer than the antennular peduncles, much longer than the anterior border of the carapace : eyes small : ophthalmic scales rather large, spinose, approximated.

Antennal acicle stout, a little overlapping the base of the terminal joint of the peduncle : antennal flagellum stout, about as long as the carapace.

Chelipeds subequal, about as long as the carapace ; they and the legs remarkably hirsute : their merus is compressed and nearly as high as long, its sharp upper border and its lower surface hirsute in tufts, its inner lower border serrated : the extensor surface of the wrist, hand, and fingers is beset with conical tubercles or stout spines, from each of which springs a tuft of stiff yellow or brown bristles : the hands are short, broad, and globous inferiorly : the fingers are short and very broad. The 2nd and 3rd pairs of legs are thickly beset with tufts of yellow and brown bristles, which are long and stiff on the edges of the joints. The 2nd pair exceed the chelipeds by their dactylus and more than half their propodite, which latter joint is considerably longer than the dactylus. The 3rd pair are not quite so long as the 2nd pair, and their propodite is only slightly longer than their dactylus. The propodite of the 3rd left leg has its outer surface sharply flattened and thickly hirsute.

Colours in spirit : anterior half of carapace, eyestalks, antennal peduncles, chelipeds and legs dark crimson, the chelipeds and legs profusely and conspicuously, the carapace very finely and inconspicuously maculated with yellow : the cardiac region and its vicinity are usually stained with red and finely spotted.

Length of carapace 28 millim.

$\frac{2454—60}{7}$	Reefs of G. Coco I., Andamans.	A. Alcock.
$\frac{4360}{10}$	Andamans.	Dr. J. Anderson.

Distribution : Andamans and Nicobars, Malay Archipelago, New Guinea, Liu Kiu Is., Wake I., Funafuti, Fiji, Tahiti.

9. Clibanarius cruentatus, Edw.

Pagurus cruentatus, Milne Edwards, Ann. Sci. Nat., Zool., (3) X., 1848, p. 62.

Clibanarius cruentatus, Miers, Crust. New Zealand, 1876, p. 67: Filhol, Crust. N Z. in Miss. de l'Ile Campbell, III. ii. No. 1, p. 424, pl. lii., fig. 4, 1886; de Man, Journ. Linn. Soc., Zool., XXII., 1888, p. 250: Whitelegge, Mem. Austral. Mus., III., 1897, p. 143; Thomson, Trans. N Z. Inst., 1898, p. 172.

Front half of carapace, bases of eyestalks and antennular and antennal peduncles, chelipeds and legs red, profusely maculated with yellowish-white.

The rostrum reaches the base of the ophthalmic scales. The eyestalks are as long as the anterior border of the carapace and nearly as long as the antennular peduncles: the ophthalmic scales are almost in contact.

The antennal acicle barely overlaps the base of the terminal joint of the peduncle.

Chelipeds equal: a strong spine at the far end of the inner border of the wrist: inner edge and upper surface of hand spinose, with setæ interspersed.

2nd and 3rd pair of legs sparsely setose, without any armature except a spine near the far end of the upper border of the carpus; on the left side exceeding the chelipeds by their dactylus, and on the right side by rather more. The dactylus of the 3rd pair is exactly the same length as its propodite, though it looks shorter.

The only specimen in the Museum collection is so injured that this short diagnosis is all that it furnishes.

$\frac{8105}{6}$	Mergui.	Dr. J. Anderson.

Distribution: New Zealand, Funafuti, Mergui.

10. Clibanarius albicinctus, n. sp. Plate IV., fig. 4.

This species differs from all its congeners, except the West Indian sublittoral *C. anomalus*, to which it is most closely related, in the disposition of the ophthalmic scales, which lie far apart.

Carapace smooth, nearly bare, its greatest breadth about three-quarters of its length in the middle line. Rostrum hardly more prominent than the antennal angles of the carapace.

Eyestalks stoutish, barely as long as the anterior border of the carapace, but longer than the antennular peduncles: the eyes occupy about one-seventh of the length of the stalk: ophthalmic scales short, triangular, acute, *widely separated*.

Antennal acicle stout, non-setose, just overlapping the base of the terminal joint of the peduncle: flagellum about as long as the carapace.

Chelipeds subequal, or the left very slightly larger, a little longer than the carapace, the wrist and hand sparsely beset with long silky, but stiff, setæ: the outer and under surfaces of the merus are studded with vesiculous granules: the exposed (extensor) surface of the wrist, hand and fingers is thickly studded with stout, discrete, conical spinules, which extend also on to the inflated under surface of the palm, and are not enlarged along the inner border of any of the joints. Similar conical spinules beset the upper surface of the three terminal joints of the 2nd pair of legs, but on the 3rd pair are represented by granules and pocks.

The 2nd, 3rd and 4th pairs of legs are sparsely beset with long, stiff, silky-looking setæ: in the male the 2nd pair are about a dactylus, and the 3rd pair about half a dactylus, longer than the chelipeds: in both pairs the dactylus, though it looks shorter, is equal in length to the subcylindrical propodite.

In the female both rami of the 4th abdominal appendage (appendage of 5th somite) are nearly equally well developed.

Colours in spirit: anterior part of carapace, eyestalks and antennary peduncles pink, mottled: chelipeds and next three pairs of legs bright red, each with three broad white cross-bands involving the articulations of the four terminal joints: finger-tips and claws of dactyli of 2nd and 3rd legs black with white base: the red ground of the chelipeds and legs profusely but minutely spotted with yellow.

Length of carapace 12 millim.

Inhabits broad-mouthed shells of *Tritonidea delicata*, in one case encrusted with a worm-tube.

$\frac{4301-3}{10}$. Off C. Comorin, 102 fath. "Investigator."

Calcinus, Dana.

Calcinus, Dana, U. S. Expl. Exp., Crust., pt. I., 1852, p. 456: Stimpson, Proc. Acad. Sci. Philad. (1858) 1859, p. 234: Haswell, Cat. Austral. Crust., 1882, p. 158: Henderson, Challenger Anomura, 1888, p. 61: Chevreux et Bouvier, Mem. Soc. Zool. France, 1892, p. 126: Ortmann in Bronn's Thier Reich, Malacostraca, p. 1146. Young, Stalk-eyed Crust. Br. Guiana, etc., 1900, p. 361.

Carapace elongate, broadened posteriorly, its anterior part very firmly calcified, but its posterior part—even sometimes the cardiac region—flaccid. Rostrum small but very distinct.

Abdomen well developed, soft, spirally coiled, with the terga thin and widely separated.

Eyestalks long and slender, the ophthalmic scales slender and approximated. Antennal acicle well formed, usually short : flagellum non-setose.

External maxillipeds approximated at base : the exopodites of all three pairs of maxillipeds are flagellate : the endopodite (palp) of the first maxillæ has a small recurved flagellum.

Chelipeds unequal and dissimilar, the left being vastly the larger : the fingers move in an obliquely vertical plane, and the finger-tips are calcareous and much spooned.

4th pair of legs subchelate, 5th pair chelate : both of them bear the usual sub-terminal pavement of corneous imbricating granules, as also do the appendages of the tail-fan.

The abdomen has no paired appendages except those that form the tail-fan : in both sexes there are on the left side (somites 2—5) 4 biramous appendages, which, as usual, are largest in the female. The telson and caudal appendages are more developed on the left side than on the right.

The gills are phyllobranchiæ and are 13 on either side, disposed as in *Paguropsis*, *Paguristes*, and *Clibanarius*.

The hard parts of the exoskeleton have a dense porcellanous texture, and as a rule are vividly variegated.

Calcinus (as Bouvier has remarked) is very closely related to *Clibanarius*, differing only in the form of the chelipeds and the denser texture of the hard parts of the exoskeleton.

The distribution of the genus is practically the same as that of *Clibanarius*, the species being found in tropical and subtropical waters all round the globe, but having less tendency than those of *Clibanarius* to spread outside the tropics.

The majority of *Calcini* belong to the Indo-Pacific fauna, ranging from the east coast of Africa and the Red Sea to California, Panama, and Chili, but not going much beyond the parallels of 25°N. and 35°S. In the West Indies and neighbourhood we find one (or three) species ; and one species is known from the islands of the Western Atlantic (Azores to Cape Verde). One of these Western Atlantic species (*C. ornatus* Roux) occurs in the Mediterranean, where indeed it was first discovered ; and to my mind it is a significant fact—one of many similar facts that may assist us in our search for the ancient boundaries (or open connexions) of the Mediterranean—that the nearest relative of this species is the Indo-Pacific *C. Herbstii*.

Key to the Indian species of the genus Calcinus.

I. Eyestalks as long as the anterior border of the carapace: upper border of right hand entire; posterior border of propodite and dactylus of 3rd pair of legs non-setose — *C. herbstii.*

II. Eyestalks much longer than the anterior border of the carapace: upper border of right hand serrated: posterior border of dactylus and of neighbouring end of propodite of 3rd pair of legs hirsute:—

A. Eyestalks about $1\frac{1}{3}$ times the length of the anterior border of the carapace; ambulatory legs with broad alternating cross-bands of blue, or white, and chestnut brown, or red: fingers closely studded with pearl-like tubercles — *C. elegans.*

B. Eyestalks about $1\frac{1}{2}$ times the length of the anterior border of the carapace; legs not cross-banded:—

i. The lower border of the left palm forms a serrated carina — ... *C. latens.*

ii. Lower border of left palm not carinate or serrate:—

a. Chelipeds and legs (in spirit) rich chestnut brown, except the tips which are white — — *C. gaimardii.*

b. Colours fading in spirit, but the basal part of the dactyli of the 2nd and 3rd legs remains dark violet, or purple-brown — *C. terræ-reginæ.*

1. Calcinus herbstii, de Man. Plate V., fig. 4.

Calcinus herbstii de Man, Archiv für Naturges. LIII., 1887, i. p. 437, and Ann. Mus. Genov. (2) XIX., 1898, p. 270: Ortmann, Zool. Jahrb., Syst. VI., 1892, p. 292: Henderson, J.A.S.B. LXV., 1896, pt. ii., p. 518: Borradaile, P.Z.S., 1898, p. 462: Nobili, Ann. Mus. Genov. (2) XX., 1900, p. 493.

Pagurus tibicen, Milne Edwards, Ann. Sci. Nat. Zool. (2) VI., 1836, p 278, and (3) X., 1848, p. 63; and Hist. Nat. Crust. II., 1837, p. 229; and in Cuvier, Règne Animal, pl. xliv., fig. 3: Krauss, Sudafr. Crust., 1843, p. 57: *Calcinus tibicen*, Dana, U. S. Expl. Exp. Crust., pt. I., 1852, p. 457: Stimpson, Proc. Ac. Philad. (1858) 1859, p. 247: Heller, Novara Crust, 1865, p. 87: Hilgendorf, in v. d. Decken's Reise Ost-Afr. III. i., 1869, p. 97, and MB. K. Ak. Berlin, 1878, p. 823; Streets, Bull. U. S. Nat. Mus. VII. 1877, p. 116: Miers, Phil. Trans Roy. Soc. 168, 1879, p. 491, and Zool. H.M.S. Alert, 1884 pp. 519, 557: Richters in Mobius Meeresf. Maurit. 1880, p. 161: Lenz and Richters, Abh. Senckenb. Ges. XII 1881, p. 426; Muller, Verh. Ges. Basel. VIII. 1886, p. 472: Henderson, Challenger Anomura, 1888, p. 61 Whitelegge, Mem. Austral. Mus. III. 1897, p 144.

Pagurus laevimanus, Randall, Journ. Acad. Philad. VIII. 1839, p. 135 *(fide* Dana)

Eyestalks stoutish, slightly curved, exactly (sometimes barely) as long as the front border of the carapace, longer than the peduncles of the antennules, which latter are longer than those of the antennæ: ophthalmic scales acute.

Antennal acicle stout, nearly reaching the end of the penultimate joint of the peduncle, both its upper borders serrated: flagellum stout, and little longer than the carapace.

Both chelipeds are smooth and unarmed, with the edges of all the joints entire. The left, which is vastly more massive than the right, is about half again as long as the carapace: there is an oblique groove across the near end of the outer surface of its carpus: its merus is slightly higher than long, its carpus and palm much higher than long, its dactylus about as long as the palm: there are a few small short tufts of bristles on the opposed edges of its fingers, which meet throughout their extent, as well as a few setæ on the fingers of the smaller hand, but otherwise the chelipeds are quite bare on the extensor surface. Sometimes there are some smooth subsquamiform markings at the lower part of the inner surface of the left (enlarged) hand.

The 2nd and 3rd legs of both sides are considerably shorter than the larger cheliped: their joints are smooth and unarmed, except for a spinule at the far end of the anterior border of the carpus: the dactyli are much shorter than the propodites. There are a few small tufts of setæ on the dactyli and perhaps at the extreme end of the propodites, but nothing like a thick brush.

Colours in spirit somewhat variable: in general (even in specimens that have been in spirit for 15 years in this climate) the anterior part of the carapace is some shade of stone-blue, and both chelipeds up to the end of the carpus are blue-black: the upper part of the hand and the near corner of the dactylus of the large cheliped, and the whole of the palm of the small cheliped, are of the same blue-black colour, but more or less of the left palm and fingers are white, and the fingers of the right cheliped are reddish or purplish at base and white at tip. The 2nd and 3rd legs have the joints up to and including the propodite, some shade of red or orange, and a median longitudinal band (with more or less of a second band below it) of darker red or brown along the merus and carpus: the dactyli are white, with red spot and cross-band, and black claws. The basal third of the eyestalks is blue, the distal two-thirds orange. The antennæ are orange or yellow.

Length of carapace 19 millim.

Distribution: Indo-Pacific from S. E. and E. Africa eastwards to the Sandwich Islands, but not outside 30°N. or 30°S.

$\frac{2083-9}{7}$: $\frac{2450-3}{7}$.	Reefs of Gt. Coco I., Andamans.	A. Alcock.
$\frac{2458}{10}$.	Andamans.	A. R. S. Anderson.
$\frac{9083}{6}$.	Palk Strait.	"Investigator."
$\frac{1117}{10}$.	Suhelipar, Laccadives.	A. R. S. Anderson.
[1406.	"South Seas."	Purchased.]
[1555.	Mauritius.	Capt. Stege.]

1*a*. Calcinus herbstii var. lividus, Edw.

Pagurus lividus, Milne Edwards, Ann. Sci. Nat., Zool., (3) X. 1848, p. 63. *Calcinus herbstii* var. *lividus*, Borradaile, P.Z.S., 1898, p. 462.

Differs from typical specimens only in the following particulars:—

The body and appendages are of an almost uniform leaden colour, the left cheliped showing only faintly the darker colour-pattern.

The surface of the 2nd and 3rd legs is finely pitted in transverse lines.

From Mr. Stanley Gardiner's Maldive Islands collection: not in the Museum.

2. Calcinus elegans, Edw. Plate V., fig. 2.

Pagurus elegans, Milne Edwards, Ann. Sci. Nat., Zool., (2) VI. 1836, p. 278, pl. xiii., fig. 2, and (3) X. 1848, p. 63; and Hist. Nat. Crust. II. 1837, p. 229; Krauss, Sudafr. Crust., 1843, p. 63. *Calcinus elegans*, Dana, U. S. Expl. Exp., Crust., pt. I., 1852, p. 458, pl. xxviii. fig. 10 *a—c*; Stimpson, Proc. Acad. Philad. (1858) 1859, p. 247; Heller, Novara Crust., 1865, p. 88; Tozzetti, Magenta Crust, 1877, p. 229; Miers, Phil. Trans. Roy. Soc. 168, 1879, p. 492; Richters in Mobius Meeresf. Maurit. 1880, p. 161; de Man, Notes Leyden Mus. XII. 1890, p. 108; Ortmann, Zool. Jahrb., Syst., VI. 1892, p. 294; Henderson, J.A.S.B., LXV. 1896, pt. ii., p. 519; Whitelegge, Mem. Austral. Mus. III. 1897, p. 143; Borradaile, P.Z.S., 1898, p. 461; Lenz, Zool. Jahrb., Syst., XIV. 1901, p. 444.

Pagurus pictus, Owen, Zool. H.M.S. Blossom, 1839, Crust., p. 83, pl. xxv, fig. 2.

Pagurus decorus, Randall, Journ. Acad. Philad. 1839, p. 134.

Differs from *C. herbstii* in the following characters:—

The eyestalks, which are much slenderer, are about $1\frac{1}{3}$ times as long as the anterior border of the carapace: the antennal acicle overlaps the base of the last joint of the peduncle, and the flagellum is not so long as the carapace.

The left cheliped has a few spines on the distal border of the merus, one or two on the upper border of the carpus, and some granules on the

distal border of the carpus: and the fingers and neighbouring part of the palm are thickly beset with small depressed pearly tubercles; the fingers also meet only at tip.

The right cheliped has the upper border of the palm strongly, of the carpus less strongly, and of the merus faintly, serrate: the fingers and neighbouring part of the palm are studded with pearly tubercles.

The disproportion between the chelipeds is much less marked.

The posterior border of the 2nd and 3rd legs is setose, the setæ on that border of the dactylus and of the distal end of the propodite of the 3rd pair forming a thick brush.

Colours in spirit: chelipeds olive-green or yellow, the fingers white from the presence of the pearly tubercles: 2nd and 3rd legs marked with alternate broad cross-bands of white (or light blue) and red (or maroon), the dactyli white (or light blue) with red spots: ophthalmic scales and base of eyestalks red, shaft of eyestalk pale blue (or white): anterior part of carapace white with sometimes a few small red spots.

Length of carapace about 20 millim.

Distribution: the same as that of *C. herbstii*. Miers also mentions, but I cannot find other authority, the Pacific coast of Patagonia.

$\frac{1079-80}{10}$	Suheipar, Laccadives.	A. R. S. Anderson.
[1324	"South Seas."	Purchased.]

3. Calcinus gaimardii, Edw., Dana., Plate V., fig. 3.

Pagurus gaimardii, Milne Edwards, Ann. Sci. Nat., Zool., (3) X. 1848, p. 63.

Calcinus gaimardii, Dana, U. S. Expl. Exp., Crust., pt. I., 1852, p. 457, pl. xxviii. fig. 9: Heller, Novara Crust., 1865, p. 87: Ortmann, Zool. Jahrb., Syst., VI. 1892, p. 294: Whitelegge, Mem. Austral. Mus. III. 1897, p. 143: Borradaile, P.Z.S., 1898, p. 462.

The slender eyestalks are half again as long as the front border of the carapace. The antennal acicle overlaps the base of the terminal joint of the peduncle: the flagellum is about as long as the carapace.

The left cheliped is little longer than the right and not nearly so disproportionately massive as that of *C. herbstii*: there is a spine at the far end of the outer border of the merus, and one at the far end of the upper border of the carpus: the oblique groove on the outer surface of the carpus is indistinct and is defined externally by a conspicuous tooth: the fingers and the neighbouring surface and the lower border of the palm are very finely granulous, the fingers meeting only at tip: the palm is about as long as high.

The right cheliped is smaller, but not much shorter, than the left : the upper border of the palm and dactylus is serrated, the outer surface of the palm is granulous, and there is a spine at the far end of the upper border of the carpus and of the outer border of the merus.

The 2nd and 3rd legs slightly surpass the chelipeds : they are smooth, except for a spine at the far end of the anterior border of the carpus ; and are sparsely setose, except the posterior border of the dactylus and of the distal two-thirds of the propodite of the 3rd pair, where the setæ form a thick brush : the dactyli look much shorter, but are really little shorter than the propodites.

Colours in spirit : chelipeds and legs rich chestnut brown, the tips of the fingers—and of the dactyli behind the black claws—white ; basal two-thirds of the eyestalks rich brown, distal third blue ; antennules brown and yellow, antennæ yellow ; anterior part of the carapace more or less speckled with brown.

Length of carapace about 10 millim.

Distribution : Islands of the Indo-Pacific from Minnikoy and the Maldives to Tahiti (Nicobars, Amboina, Balabac Str. and Sulu Sea, Liu Kiu and Ohosima, Funafuti, Rotuma, and Fiji).

The specimens here described are from Minnikoy and the Maldives.

4. Calcinus terræ-reginæ, Haswell. Plate V., fig. 7.

Calcinus terræ-reginæ, Haswell, Proc. Linn. Soc., N. S. Wales, VI. 1881-82, p. 760; and Cat. Austral. Crust. 1882, p. 158 : de Man, Arch. f. Naturges. LIII. 1887, i., p. 439 ; and Journ. Linn. Soc. Zool., XXII. 1888, p. 226.

This is perhaps only a variety of *C. latens*, Randall.

The slender eyestalks are about half again as long as the anterior border of the carapace : the antennal acicle well overlaps the base of the terminal joint of the peduncle ; the flagellum is a good deal longer than the carapace.

The left cheliped is much the more massive : the upper border of the merus is faintly serrulate ; there is a spinule at the far end of the upper border of the carpus ; the oblique groove on the outer surface of the carpus is faint, and is defined externally by a conspicuous tubercle : the palm is very slightly longer than high, its lower border and that of the fixed finger are granulous on the inner aspect : the fingers meet only at tip, and their opposed edges are obscurely toothed.

The right cheliped shows a large terminal spine on the upper border of the wrist : the outer surface of the wrist and hand bears numerous scattered

granules, each of which gives origin to a seta : the upper border of the wrist forms a high 4- or 5-toothed crest, and the same border of the dactylus is serrated.

The 2nd and 3rd legs slightly surpass the larger cheliped : their dactyli, though they look much shorter, are really not much shorter than the propodites : the only armature is a spine at the far end of the anterior border of the carpus. These legs are sparsely setose, but on the posterior border of the dactylus and of the distal end of the carpus of the 3rd pair there are some tufts—not very thick set—of bristles.

Colours in spirit : the most constant colouring is that of the dactylus of the 2nd and 3rd legs, which is dark purple at base and ends in a black claw : in some specimens the chelipeds—hand excepted—and the carpus of the 2nd and 3rd legs are olive green, and the other long joints—dactylus excepted—of the legs are light red.

Length of carapace 13 millim.

Distribution : Maldives and Minnikoy, Mergui, Malay Archipelago, Queensland.

$\frac{8095}{6}$. Mergui. J. Anderson.

Numerous specimens were taken at Minnikoy and in the Maldives by Mr. Stanley Gardiner.

5. Calcinus latens, Randall, Dana. Plate V., fig. 5.

Pagurus latens, Randall, Journ. Acad. Nat. Sci. Philad., 1839, p. 135 (*fide* Dana). *Calcinus latens*, Dana, U. S. Expl. Exp., Crust. pt. I. 1852, p. 459, pl. xxviii. fig. 11 : Stimpson, Proc. Acad. Philad. (1858) 1859, p. 247 : Heller, Novara Crust. 1865, p. 88 : Streets, Bull. U. S. Nat. Mus. VII. 1877, p. 117 : Hilgendorf MB. K. Akad. Berlin, 1878, p. 823 : Richters, in Mobius Meeresf. Maurit. 1880, p. 161 : Bouvier, Bull. Soc. Philomath. (8) IV. 1891-92, p. 54 : Ortmann, Zool. Jahrb., Syst. VI., 1891-92, p. 293 : Whitelegge, Mem. Austral. Mus. III. 1897, p. 143 : Borradaile, P.Z.S. 1898, p. 463 : Lenz, Zool. Jahrb., Syst., XIV. 1901, p. 443. *Calcinus intermedius* de Man, Notes Leyden Mus. III. 1881, p. 102 (see de Man, Notes Leyden Mus. XIII. 1891, p. 58).

This species agrees in all respects, except the following, with *C. terræ-reginæ*, and possibly the latter is merely a variety of *C. latens*.

In the large left cheliped the upper and distal borders of the wrist are serrate ; the outer surface of the wrist carries, besides the conspicuous tubercle, numerous scattered denticles ; the upper border of the palm and dactylus is serrulate, and *the lower border of the palm is carinate and serrate.*

As in *C. terræ-reginæ* the most persistent colour-mark is that of the dactylus of the 2nd and 3rd legs, the base of which is dark purplish brown.

Distribution : from the Red Sea, Gulf of Aden and east coast of Africa, eastwards to the Sandwich Islands (*i.e.*, from about 40°E. to about 160°W.), and within these meridians, from about 27°N. (G. Liu Kiu) to about 34°S. (Sydney).

From Mr. Stanley Gardiner's Maldive collection.

[1440 Rarotonga (Cook Is.) Purchased.]

Diogenes, Dana.

Diogenes, Dana, U. S. Expl. Exp., Crust. pt. I. 1852, p. 438 : Stimpson, Proc. Ac. Nat. Sci. Philad. (1858) 1859, p. 232 : Heller, Crust. sudl. Europ., 1863, p. 169 : Haswell, Cat. Austral. Crust. 1882, p. 156 : Henderson, P. Roy. Phys. Soc. Edinb. IX. 1885-88, p. 66, and Challenger Anomura, p. 53 : Stebbing, Hist. Crust. 1893, p. 160 ; Ortmann in Bronn's Thier Reich, Malacostraca, p. 1146.

Carapace usually (but not always) elongate, broadened posteriorly, well calcified in front of the cervical groove and in the neighbourhood of the cardiac region. Rostrum replaced by a movable rostriform process of the ophthalmic somite.

Abdomen well developed, soft, spirally coiled ; the terga widely separated.

Eyestalks moderately slender, ophthalmic scales large, separated by the aforesaid movable "rostrum." Antennal acicle well formed : flagellum more or less setose.

External maxillipeds approximated at base : the exopodites of all three pairs of maxillipeds are flagellate : the endopodite (palp) of the 1st pair of maxillæ has a small recurved flagellum.

The chelipeds are dissimilar and unequal, the left being greatly the larger : the fingers open and close in an obliquely vertical direction and the finger-tips are acuminate and calcareous.

The 4th pair of legs are subchelate, and the 5th pair chelate : in both, at the distal end of the outer surface, there is a patch of imbricating corneous granules, as there is, also, on both rami of the tail-fan.

The abdominal appendages, in addition to those that form the tail-fan, are 4 in number (somites 2—5) and are placed on the left side : in the male they are uniramous, in the female the first three are biramous. The telson and other parts of the tail-fan are more developed on the left side than on the right.

The gills are phyllobranchiæ, and are 13 in number on either side, disposed as in *Paguropsis*, *Paguristes*, *Clibanarius* and *Calcinus*.

Diogenes is a characteristic Indo-Pacific genus, and does not, so far as is known, extend into depths beyond 68 fathoms.

Of the 28 or 29 recognised species 25 are found only in the Indo-Pacific, from the Gulf of Aden and E. coast of Africa (about 40° E.) to Funafuti Atoll (about 178°E.); 3 are known from the old-world shores of the Atlantic, from the English Channel to the Cape of Good Hope, and 1 seems to be restricted to the Mediterranean.

Of the 3 Atlantic species one (*D. pugilator*) is also found in the Mediterranean, in the Gulf of Aden, and perhaps in Indian Seas as far east as Singapore; one (*D. denticulatus*) is also found in the Gulf of Aden; and one (*D. brevirostris*) is by some authors considered to be identical with the wide-ranging *D. pugilator*.

So far as I can ascertain, no representative of this genus has been discovered west of the Cape Verde Is.

The species of *Diogenes* are often difficult to determine, partly because many of them are very variable, and partly on account of the more than ordinary confusion of names. The names here adopted for the common species are those of Prof. Henderson, who in all matters of this sort seems to me to combine patience and accuracy of research, with sobriety of judgment, in an enviable degree.

Key to the Indian Species of the genus Diogenes.

1. The rostrum is a narrow lamina, with the free edge spinose, at any rate distally:—

   A. The carapace is longer than broad: left hand when fully extended not inclined inwards:—

      i. Antennal acicle bifurcate, the inner (shorter) branch reaches the base of the terminal joint of the peduncle: outer surface of left hand beset with conical tubercles, each of which carries a wreath of short stiff radiating setæ ... ... *D. merguiensis.*

      ii. Antennal acicle bifurcate, the inner branch reaches about half-way along the penultimate joint of the peduncle:—

         a. The outer (longer) branch of the antennal acicle just, or barely, reaches the base of the terminal joint of the peduncle: outer surface of left hand beset with claw-shaped spines ... *D. diogenes.*

         b. The outer branch of the acicle reaches well beyond the base of the last joint of the peduncle: outer surface of left hand closely and finely granulous ... *D. custos*, (Fabr.)

iii. Antennal acicle obscurely bifurcate, the outer branch does not reach the base of the terminal joint of the peduncle ; outer surface of left hand closely and finely granulous :—

a. Left hand nearly oval, the palm higher than long ... ... *D. affinis.*

b. Left palm as long as high, the lower part of its outer surface flattened ... ... *D. planimanus.*

c. Left hand oblong, the palm longer than high ... ... *D. violaceus.*

B. The carapace is broader than long: left hand, even when fully extended, strongly inclined inwards ... *D. miles* (Herbst.)

II. The rostrum is a slender simple (non-serrated) spinule :—

A. Eyestalks not so long as the anterior border of the carapace, or as the antennal peduncle :—

i. Fixed finger of left cheliped deflexed :—

a. The eyestalks reach nearly to the middle third of the terminal joint of the antennular peduncle (wrist and hand of left cheliped of adult male remarkably elongate) ... ... *D. avarus.*

b. The eyestalks hardly reach the base of the terminal joint of the antennular peduncle :—

1. A single obliquely-longitudinal crest on the outer surface of the left palm ... *D. costatus.*

2. Two obliquely-longitudinal crests on the outer surface of the left palm ... *D. bicristimanus.*

ii. Fixed finger of left cheliped not deflexed : a single longitudinal row of spinules on upper part of outer surface of left palm :—

a. Antennal peduncle very decidedly shorter than antennular peduncle *D. rectimanus.*

b. Antennal and antennular peduncles of equal length ... ... *D. investigatoris.*

B. Eyestalks considerably longer than anterior border of carapace, or than antennal peduncle : left cheliped pilose ... ... *D. gardineri.*

1. Diogenes diogenes Herbst, Henderson. Plate XV., fig. 3.

Cancer diogenes, Herbst, Krabben, II. i. 1791, p. 17, pl. xxii., fig. 5.

Diogenes diogenes, Henderson, Trans. Linn. Soc., Zool., (2) V. 1893, p. 412.

Pagurus miles, Fabricius. Ent. Syst. Suppl. 1798, p. 412: ?Milne Edwards, Ann. Sci. Nat. Zool. (2) VI. 1836, p. 284 [*nec.* pl. xiv., fig. 2].

Greatest breadth of carapace about three-fourths its length in the middle line; the anterior and antero-lateral borders more or less crenulate and spinulose; numerous spinules and transverse serrated setose ridges on anterior half, and scattered vesiculous granules on posterior half of carapace; branchial regions with numerous tufts of setæ.

Rostrum much longer than ophthalmic scales, more than a third the length of the eyestalks, its anterior half spinose.

Eyestalks about four-fifths the length of the anterior border of the carapace, only just surpassing the 2nd joint of the antennular, and hardly reaching the middle of the terminal joint of the antennal, peduncle. Ophthalmic scales large, the free edge spinulose.

The antennal peduncle reaches to about the middle of the terminal joint of the antennular peduncle: the antennal acicle is bifurcate, the opposed edges of the forks being spinulose; the outer (longer) fork just, or barely, reaches the base of the terminal joint, the inner fork reaches about half-way along the penultimate joint of the peduncle: flagellum nearly half again as long as the carapace, sparsely setose near the base only.

The chelipeds and legs are copiously and elegantly spinose, and the edges of their joints also setose, the fingers of the smaller cheliped and the dactyli of the 2nd and 3rd legs being thickly plumed.

Left cheliped nearly twice as long as the carapace; the merus, carpus and palm of nearly equal length; the carpus triangular and longer than broad, and the palm a little broader than long: a sinuous groove on the upper surface of the wrist and a broad oblique patch on the outer surface of the palm are deficient in spines: the spines on the outer surface of the palm are claw-shaped. The dactylus makes up two-thirds of the total length of the hand and its spines are arranged in raised longitudinal rows (of which two in the upper part of the outer surface are particularly prominent), as they are also on the propodites of the 2nd and 3rd legs.

In the 2nd and 3rd legs the anterior edges of the joints are spinose and the outer surfaces granulose, the propodites, as mentioned, being also fluted with rows of spines. The legs on the left side just exceed, those on the right side exceed by about half their dactylus, the larger cheliped. The dactyli in both pairs are more than half as long again as their propodites.

Length of carapace 28 millim.

The species inhabits all sorts of wide-mouthed shells encrusted with sea-anemones, hydroids, cirripedes, &c.

$\frac{376-300}{7}$: $\frac{411}{7}$.	Orissa coast, 6—11 fath.	"Investigator."
$\frac{4257-8}{10}$.	Orissa coast, 68 fath.	
$\frac{1704-5}{7}$.	Ganjam coast, 10 fath.	
$\frac{601-5}{10}$.	Off Indus Delta	
$\frac{8000}{9}$.	Sandheads, R. Hooghly	J. Daly.

The distribution of this species, owing to the confusion of names, is uncertain. It is common along the east coast of the Indian peninsula.

2. Diogenes merguiensis, de Man. Plate XV., fig. 2.

Diogenes merguiensis, de Man, Journ. Linn. Soc., Zool., XXII. 1888, p. 228, pl. xv., fig. 4—6; Henderson, Tr. Linn. Soc., Zool, (2) V. 1893, p. 413.

Pagurus miles, Milne Edwards, Ann. Sci. Nat. Zool., (2) VI. 1836, [p. 284] pl. xiv, fig. 2, and (3) X. 1848, p. 64, and Hist. Nat. Crust. II. 1837, p. 235: *Diogenes miles*, Dana, U. S. Expl. Exp., Crust. pt. I. 1852, p. 439, pl. xxvii., fig. 9 *a—b*: Haswell, Cat. Austral. Crust. 1882, p. 156.

This species is very like *D. diogenes*, from which it differs in the following particulars:—

The eyestalks are shorter and much thicker: they are less than two-thirds the length of the anterior border of the carapace, and fall very far short of the middle of the terminal joint of the antennal peduncle: the eyes are much larger.

The outer fork of the antennal acicle reaches nearly to the middle of, and the inner fork well overlaps the base of, the terminal joint of the peduncle: the antennal flagellum is shorter than the carapace, and is more setose.

Though the *edges* of their joints are spinose, the outer surface of the chelipeds and legs is closely beset with sharp conical tubercles rather than spines, and every tubercle is ornamented with a wreath of short stiff radiating setæ.

The left cheliped is only half again as long as the carapace; its merus is as broad as long, its palm much broader than long, and its fingers shorter and more compressed: the setose tubercles cover the whole of the outer

surface of the wrist and hand, and there is only one row of enlarged spines along the upper surface of the dactylus.

The 2nd and 3rd legs correspond with the chelipeds in having their joints (except the dactyli) shorter and broader than in *D. diogenes*.

It inhabits wide-mouthed shells.

$\frac{1674-5}{7}$.	Ganjam coast, 10 fath.	"Investigator."
$\frac{2193-4}{7}$.	Ganjam coast, 7—8 fath.	
$\frac{2360}{7}$.	Ganjam coast, $7\frac{1}{2}$—$9\frac{1}{2}$ fath.	
$\frac{3487-8}{7}$.	Ganjam coast, $10\frac{1}{2}$ fath.	
$\frac{4256}{10}$.	Orissa coast, 68 fath.	
$\frac{4319}{10}$.	Madras	Purchased.

de Man's types from Mergui seem to have been lost.

The distribution of this species is uncertain.

3. Diogenes custos, Fabr., Henderson. Plate VI., fig. 1.

Pagurus custos, Fabricius, Ent. Syst. Suppl., 1798, p. 412: Bosc, Hist. Nat. Crust. II. 1802, p. 77: Latreille, Hist. Nat. Crust. VI. 1803, p. 165: Olivier, Encycl. Method. VIII. 1811, p. 644: Milne Edwards, Ann. Sci. Nat., Zool., (2) VI. 1836, p. 284, and (3) X. 1848, p. 64, and Hist. Nat. Crust. II. 1837, p. 236: *Diogenes custos*, Henderson, Tr. Linn. Soc., Zool., (2) V. 1893, p. 414: Nobili, Boll. Mus. Torino, XVIII. No. 452, 1903, p. 15.

Diogenes miles, de Man, Journ. Linn. Soc., Zool., XXII. 1888, p. 232: Nobili, Ann. Mus. Civ. Genova, XX. 1900, p. 492: Whitelegge, Mem. Austral. Mus. IV. Pt. 2, 1900, p. 166.

Differs from *D. diogenes* in the following particulars:—

The eyestalk is shorter, being less than two-thirds the length of the anterior border of the carapace: hence the rostrum is longer in relation to the eyestalk, being nearly half its length.

The antennular and antennal peduncles are of equal length.

The outer fork of the antennal acicle reaches well beyond the base of the terminal joint of the peduncle: the antennal flagellum is not quite as long as the carapace, and is quite thickly setose in its proximal half. [The inner fork of the antennal acicle reaches about half-way along the penultimate joint of the peduncle].

Though the edges of some of the joints of the chelipeds and legs—*e.g.*, all the edges of the merus, the inner border of the carpus, and the upper border of the hand and dactylus of the chelipeds; and the anterior

border of the four terminal joints of the 2nd and 3rd legs—are spinose or spinulose, the exposed surfaces of these appendages are finely and copiously granular, they are also much barer of setæ. On the upper border of the dactylus of the left cheliped there is only one longitudinal comb of enlarged serrations. The granules on the outer surface of the propodites of the 2nd and 3rd legs are arranged in close-set, transverse, almost squamiform, series.

The species inhabits all sorts of wide-mouthed, often encrusted, shells.

Distribution: Seas of India, S.-E. coast of Australia, to 18 fathoms.

$\frac{3157}{5}$: $\frac{8003}{9}$.	Sandheads, R. Hooghly	J. Barnett.
$\frac{1767-75}{7}$.	Off Vizagapatam coast, 9—7½ fath.	"Investigator."
$\frac{3286}{10}$.	Andamans	"Investigator."
$\frac{7912-21}{9}$: $\frac{7980}{9}$: $\frac{4361-2}{10}$.	Sandheads, R. Hooghly	Messrs. Milner, Daly, and West.
$\frac{4728}{10}$.	Mergui	J. Anderson.

3*a*. Diogenes custos var. affinis Henderson. Plate VI., fig. 2.

Diogenes affinis, Henderson, Tr. Linn. Soc., Zool, (2) V. 1893, p. 415, pl. xxxix., fig. 1, 2; Nobili, Boll. Mus. Torino, XVIII. No. 452, 1903, p. 15.

Diogenes custos, Dana, U. S. Expl. Exp., Crust. pt. I. 1852, p. 439, pl. xxvii., fig. 10 *a-g*. ? ?Stimpson, Proc. Ac. Nat. Sci. Philad., (1858) 1859, p. 245: ?Hess, Archiv f. Nat. xxxi. 1865, i. p. 161: ?Haswell, Cat. Austral. Crust. 1882, p. 157: Henderson, Challenger Anomura, 1888, p. 53: ?Ortmann, Zool. Jahrb., Syst. VI. 1892, p. 294.

This form differs from typical *D. custos* in the following particulars:—

The rostrum is shorter, being little longer than the ophthalmic scales.

The antennular peduncle is often distinctly shorter than the antennal peduncle.

The inner fork of the antennal acicle is so short that the acicle can hardly be called bifurcate, nor does the outer fork reach to the base of the terminal joint of the peduncle.

The antennal flagellum is not much more than half the length of the carapace, and is thickly setose almost to the tip.

In the left cheliped the hand is shorter and broader, the dactylus does not make up two-thirds the total length of the hand, and the lower edge of the fixed finger is sinuous.

The anterior surface of the propodite and dactylus of the 2nd and 3rd legs is granulose, not spinulose.

Distribution : Bay of Bengal, S. E. coast of Australia.

$\frac{4708-13}{10}$.	Orissa coast	"Investigator."
$\frac{4368-70}{10}$.	Akyab	W. Dodgson.

3*b*. DIOGENES CUSTOS var. VIOLACEUS, Henderson. Plate VI., fig. 4.

Diogenes violaceus, Henderson, Tr. Linn. Soc., Zool., (2) V. 1893, p. 416, pl. xxxix., fig. 3, 4.

This form differs from typical *D. custos* in the following particulars :—

As in var. *affinis* the inner fork of the antennal acicle is nearly obsolete, and the outer fork falls far short of the base of the terminal joint of the peduncle.

The hand of the left cheliped is entirely different in form : its palm is decidedly longer than broad, so that the dactylus, though long, does not make up two-thirds the total length of the hand ; and the hand as a whole is oblong instead of nearly oval.

The antennal flagellum is less coarsely setose.

From var. *affinis*, which it resembles in the form of the antennal acicle, it differs in having a longer rostral scale, and a longer antennal flagellum, and in the long and comparatively narrow left hand, the fixed finger of which has a straight lower margin.

$\frac{7552}{6}$.	Vizagapatam	Museum Collector.

The only specimen in the Indian Museum inhabited a broad-mouthed violet shell of *Leiodomus lividus*.

3*c*. DIOGENES CUSTOS var. PLANIMANUS, Henderson. Plate VI., fig. 3.

Diogenes planimanus, Henderson, Tr. Linn. Soc., Zool., (2) V. 1893, p. 416, pl. xxxix., fig. 5, 6: Lanchester, P. Z. S., 1902, II., p. 365: Nobili, Boll. Mus. Zool. Torino, XVIII. No. 452, 1903, p. 15.

Differs from typical *D. custos* in the following particulars :—

As in var. *affinis* and var. *violaceus* the inner branch of the antennal acicle is obsolete, and the outer branch falls far short of the base of the terminal joint of the peduncle.

As in var. *affinis* the rostrum is short, not much exceeding the ophthalmic scales, but it is remarkably narrower.

On the outer surface of the carpus of the left cheliped there is an irregular row of enlarged granules parallel with the inner border.

The palm of the hand is as long as high, and the lower portion of its outer (granular) surface forms a flat facet bounded posteriorly by a short ridge running parallel with the carpal articulation; the granules on this ridge and at the junction with the lower border of the palm are enlarged.

The left hand when fully extended has a slight inclination inwards.

From var. *affinis* it is distinguished by the form of the hand, the fixed finger of which, also, is straight; the narrower and slightly longer rostrum, and the longer antennal flagellum.

From var. *violaceus* it is distinguished by the form of the hand, and by the more setose antennal flagellum.

$\frac{404-406}{7}$.	Orissa coast, 7½ fath.	"Investigator."
$\frac{1650-53}{7}$.	Ganjam coast	
$\frac{1906}{7}$.	Ganjam coast, 9½ fath.	

Distribution: Bay of Bengal, Malay Peninsula.

4. Diogenes miles, Herbst, Henderson. Plate VI., fig. 5.

Cancer miles, Herbst, Krabben, II. 1791, p. 19, pl. xxii. fig. 7: *Diogenes miles*, Henderson, Tr. Linn. Soc., Zool., (2) V. 1893, p. 413: Nobili, Boll. Mus. Torino, XVIII. No. 452, 1903, p. 14.

Pagurus diaphanus, Fabricius, Ent. Syst. Suppl. 1798, p. 412: Bosc, Hist. Nat. Crust. II. 1802, p. 77: Latreille, Hist. Nat. Crust. VI. 1803, p. 165: Olivier, Encycl. Method. VIII. 1811, p. 645: Milne Edwards, Ann. Sci. Nat. Zool. (2) VI. 1836, p. 285, and (3) X. 1848, p. 64, and Hist. Nat. Crust. II. 1837, p. 236.

Cephalothorax broad and very flat. Carapace broader than long; the region in front of the cervical groove contracted, and beset—except for a well-defined smooth patch in the mid-gastric region—with transverse setose serrulated ridges. Behind the cervical groove there are numerous tufts of setæ and vesiculous granules.

Rostral appendage longer than the ophthalmic scales, two-fifths to one-third the length of the eyestalk, its edge spinulose.

Eyestalks about three-fifths the length of the anterior border of the carapace, reaching nearly to the middle of the terminal joint of the antennular peduncle, but not much beyond the base of the terminal joint of the antennal peduncle, the antennal being a little longer than the antennular peduncles.

Antennal acicle hardly bifurcate, its outer limb reaches the base of the terminal joint of the peduncle. Flagellum hardly two-thirds the length of the carapace, coarse, thickly setose almost to the tip.

Left cheliped vastly larger than the right, with the wrist much inclined outwards and the hand inwards; its length, measured in a straight line, is more than $1\frac{2}{3}$ times the length of the carapace. The merus is broad and trigonal, its broadly-convex upper surface and its lower surface granulous, its anterior edge spinose: the carpus is much longer than broad, and is peculiarly curved outwards owing to the prominence of its inner angle, its upper surface is beset with rows of granules, its inner border is hirsute: the palm is half again as long as broad, and broadens distally; its edges are granulous and its outer surface finely reticulated and microscopically granulous: the fingers have the outer surface granulous and the opposed edges setose in tufts: the dactylus makes up very little more than half the total length of the hand.

The edges of the right cheliped are hirsute, and its dactylus is very long.

The 2nd and 3rd legs of both sides exceed the left cheliped by nearly half their dactylus: the merus and carpus are short, and have the anterior edge spinose and the outer surface granulous: the stout propodites have the anterior surface granulous in longitudinal lines and the outer surface in transverse lines: the dactyli, which are somewhat falciform, are twice the length of the propodites and have their concave edge plumose.

Length of carapace 22 millim.

All the Indian Museum specimens are in shells of *Oliva*, to the long narrow aperture of which the broad flat body is well adapted.

Distribution: coasts of peninsular India.

54.	Malabar coast	F. Day (2).
$\frac{7553}{6}$.	Vizagapatam	Museum Collector (2).
$\frac{398}{7}$. $\frac{417}{7}$.	Orissa coast, 7-10 fath.	"Investigator."
$\frac{4331-8}{10}$.	Madras	Purchased (21).

5. Diogenes avarus, Heller. Plate VI., fig. 6.

Diogenes avarus Heller, Novara Crust. 1865, p. 83, pl. vii., fig. 2: Walker, Journ. Linn. Soc., Zool. XX. 1887, p. 113, pl. viii., fig. 6, 7: de Man, Journ. Linn. Soc., Zool., XXII. 1888, p. 236: Henderson, Tr. Linn. Soc., Zool., (2) V. 1893, p. 417: Ortmann, in Semon's Zool. Forschungsr. V. 1894, p. 32: Nobili, Boll. Mus. Torino, XVIII, No. 452, 1903, p. 15.

Carapace moderately elongate, its antero-lateral border finely serrulate; there are some scattered vesiculous granules on the gastric (and cardiac) region, but very few and faint transverse markings.

Rostrum a slender spine, not so long as the ophthalmic scales: these are large and have the antero-internal angle spinulose.

Eyestalks stout, not two-thirds the length of the anterior border of the carapace, reaching nearly to the middle third of the terminal joint of the antennular and antennal peduncles: eyes large.

The antennular are slightly longer than the antennal peduncles. The antennal flagellum is shorter than the carapace and not much setose. The antennal acicle is a simple spine, with the inner edge spinulose, and barely reaches to the terminal joint of the peduncle.

The left cheliped is vastly longer than the right, and in the adult male is nearly 2½ times the length of the carapace. The joints are nude and closely and crisply granulous, most finely so on the hand. The carpus is longer than the merus and a little longer than the palm of the hand, its inner edge is very well defined and serrate. The palm of the hand is about half again as long as broad: its outer surface is longitudinally carinated near the middle line, the carina gradually fading away before the finger-cleft is reached: its upper border, like that of dactylus, is usually serrulate. The fixed finger is deflexed, and the dactylus does not constitute quite half the total length of the hand.

In the female and young male the length of the left cheliped, especially of the wrist and palm, is much less than in the adult male, and in the Indian Museum there is a series of specimens well illustrating this fact, which, as regards the young, was first noticed by de Man.

The right cheliped is setose, especially as to the fingers: in the adult male it does not reach to the middle of the left carpus.

The 3rd right leg, which is a little longer than the 2nd, hardly reaches the base of the dactylus of the left cheliped. Both pairs of legs are almost smooth as to the surface, but have the anterior edge of the carpus and propodite spinulose and setose: the dactyli, which are longer than the propodites, are plumose. Length of carapace about 10 millim.

Distribution: East Africa, Persian Gulf, Bay of Bengal, Singapore, Torres Straits.

$\frac{8108}{6}$.	Mergui	J. Anderson.
$\frac{4714-20}{10}$.	Madras	Purchased (a series).
$\frac{4723-4}{10}$.	Persian Gulf	W. T. Blanford.

6. Diogenes costatus, Henderson. Plate VI., fig. 7.

Diogenes costatus, Henderson, Tr. Linn. Soc., Zool., (2) V. 1893, p. 418, pl. xxxix., fig. 7, 8.

Carapace moderately elongate, antero-lateral margins serrulate, a few transverse serrulate ridges in front of the cervical groove.

Rostrum a slender spine, shorter than the ophthalmic scales, which are large and have their antero-internal angle spinulose.

Eyestalks about four-fifths the length of the antero-lateral border of the carapace, hardly reaching the base of the terminal joint of the antennular peduncles, and only slightly surpassing the same point in the antennal peduncles. Eyes small.

The peduncles of the antennules exceed those of the antennæ by nearly half their terminal joint. Antennal flagellum a little longer than the carapace, thickly setose nearly to the tip. Antennal acicle a simple spine, strongly spinose along the inner edge, just reaching the base of the terminal joint of the peduncle.

Left cheliped vastly larger than the right, its length in a straight line twice that of the carapace: merus a little shorter than the carpus, carpus a little shorter than the palm, palm a little longer than broad, fixed finger deflexed, the dactylus constituting a little more than two-thirds the total length of the hand: all the borders of the merus are serrated, the two lower borders strongly so: the inner border of the carpus is strongly serrated, the spines increasing in size up to the terminal one, the anterior and inferior borders are also spinose, and the outer surface is beset with granules and spinules except in a groove running parallel with the inner border: both borders of the palm are straight, the upper border being strongly serrated, the lower border being serrated only in its proximal half, and these serrations often being blunted and almost worn away; the outer surface of the palm is nearly smooth, but is traversed by a ridge which, beginning at the lower proximal angle, runs up parallel with the carpal articulation (where it is granular) and then curves round and is continued obliquely almost to the finger-cleft. The upper edge of the strongly compressed dactylus is serrated, the lower edge of the fixed finger is smooth.

The right cheliped hardly reaches the base of the left hand; it is granular, spinose, and—especially on the hand—setose. The 2nd and 3rd legs do not quite reach the end of the larger cheliped, the anterior edge of the carpus and propodite is spinulose and setose, the spinules of the carpus being the most distinct: the dactyli are longer than the propodites, and are plumose.

Length of carapace about 12 millim. Inhabits all sorts of broad-mouthed shells, often encrusted with sea-anemones. Distribution : East coast of Indian Peninsula.

$\frac{3150}{5}$.	Sandheads, R. Hooghly	A. J. Milner (12).

7. Diogenes rectimanus, Miers. Plate VI., fig. 8.

Diogenes rectimanus, Miers, Zool. H. M. S. Alert, p. 262, pl. xxvii., fig. *c*: Henderson, Tr. Linn Soc., Zool., (2) V. 1893, p. 419: Lanchester, P. Z. S., 1902, II, p. 366.

This species is very similar to *D. costatus*, from which it differs in having a more elongate carapace with more oblique antennal borders, and in the form of the left cheliped.

In the left cheliped the upper border of the merus is ill-defined, and the inner lower border is not spinose ; the palm of the hand is as high as long, and the fixed finger is not deflexed ; the whole outer surface of the palm and fingers is granulous ; the spines on the lower edge of the hand are not worn or obsolescent, but are acute and are continued on to the edge of the fixed finger ; there is no oblique crest in the lower part of the outer surface of the palm, but in the upper part there is a row of spines parallel with the upper border.

In the 2nd and 3rd legs the anterior border of the propodite is very obscurely serrulate.

Similar in size to *D. costatus*. Distribution : East coast of India ; N. Australia.

$\frac{4320}{10}$.	Madras	Purchased (2).
$\frac{4721}{10}$.	Off Orissa coast, 68 fath.	"Investigator" (4).

8. Diogenes investigatoris, n. sp. Plate VI., fig. 9.

This species is very similar to *D. costatus* and *rectimanus*, so that only its distinguishing characters need be noted.

From *D. costatus* it differs in the following particulars :—

The carapace is narrower and more elongate. The free edge of the ophthalmic scales is spinose throughout.

The antennal is quite as long as the antennular peduncle : the antennal flagellum is remarkably coarse, and is not quite as long as the carapace. The antennal acicle falls well short of the base of the last joint of the peduncle.

The left cheliped is shorter, being, in the adult female, not half again as long as the carapace, and the edges of all its joints are considerably setose: on the lower inner border of the merus there is a single large spine: the merus is as long as the carpus, and the carpus a little longer than the palm: the palm is higher than long and the fixed finger is not deflexed. As in *D. rectimanus*, the whole outer surface of the left hand is granulous, the spines on the lower edge of the hand are continued on to the fixed finger, and there is a longitudinal row of spines in the upper part of the outer surface of the palm, but no oblique crest in the lower part.

The legs, although their edges are setose as in *D. costatus*, are practically smooth, there being only a few inconspicuous spinules at the far end of the upper border of the carpus.

From *D. rectimanus* it is distinguished in the following particulars:—

The free edge of the ophthalmic scales is spinose throughout. The antennal and antennular peduncles are of equal length: the antennal flagellum is coarser and shorter, and the antennal acicle is shorter.

The left cheliped is shorter and has a much broader hand; the upper border of its merus is serrulate and the inner lower border is armed with a large spine at its proximal end.

Length of carapace of adult female 12 millim.

$\frac{4722}{10}$. Off Vizagapatam coast, 20 fath. "Investigator."

9. Diogenes bicristimanus, n. sp. Plate VII., fig. 1.

This species also is very similar to *D. costatus*, from which it differs only in the following particulars:—

The carapace is narrower and more elongate.

The antennal acicle falls a good deal short of the base of the terminal joint of the peduncle: the antennal flagellum is considerably longer than the carapace and carries only a few lank setæ.

In the left cheliped the merus is a little longer than the carpus, and has the upper border ill-defined and the lower border not serrulate: the anterior border of the carpus is not spinose: the whole outer surface of the hand is granulous: a broad longitudinal ridge runs without a break along the middle of the outer surface of the palm and is continued downwards to the tip of the deflexed fixed finger; above this is a second obliquely-longitudinal ridge not quite reaching to the dactylus; while below it is a distinct trace of the beginnings of the oblique ridge seen in *D. costatus*: the lower edge of the fixed finger is serrated.

In the 2nd and 3rd legs the only joint whose anterior border is distinctly spinulose is the carpus.

From *D. rectimanus* and *investigatoris*, with which it agrees in having the outer surface of the hand granulous and traversed by a serrated ridge running nearly parallel with the upper border of the palm, it is at once distinguished by the deflexed fixed finger and the second longitudinal carina on the outer surface of the hand.

Length of carapace between 6 and 7 millim.

Inhabits broad-mouthed shells of *Pleurotoma*.

$\frac{1852—3}{7}$.	Ganjam coast, 15—25 fath.	"Investigator."
$\frac{536}{10}$.	Off Indus Delta, 35 fath.	

10. DIOGENES GARDINERI, n. sp. Plate VII., fig. 3.

Carapace elongate, nearly smooth, its antero-lateral borders finely serrulate. Rostrum a slender spinule slightly longer than the ophthalmic scales.

Eyestalks remarkably long, considerably longer than the anterior border of the carapace, almost as long as the peduncle of the antennules and very much longer than that of the antennæ. Ophthalmic scales spinulose at the antero-internal angle.

Antennal peduncle remarkably short, barely reaching to the base of the terminal joint of the antennular peduncle. Antennal acicle a serrated spinule barely reaching to the base of the terminal joint of the peduncle.

Chelipeds pilose. Left cheliped much the larger: when denuded its outer surface is smooth, except for a longitudinal series of 3 or 4 spines on the outer surface of the carpus: the upper border of the merus is serrulate, and the lower outer border of the merus and the inner and anterior borders of the wrist and the upper border of the palm are spinulose: a median longitudinal finely granulous bulge, or low carina, traverses the outer surface of the palm.

The 2nd and 3rd legs reach, or slightly surpass, the tip of the left cheliped: they are setose and, except for a spinule at the far end of the anterior border of the carpus, smooth: the dactyli are longer than the propodites.

Length of carapace about 4 millim.

From Mr. Stanley Gardiner's Maldive and Minnikoy collections

In the remarkably elongate eyestalk and abbreviated antennal peduncle this species resembles *D. pallescens*, Whitelegge, from Funafuti Atoll.

Besides the 13 species and varieties here described, there is in the Museum collection a small and damaged specimen from Mergui which does not seem different from the Atlantic and Mediterranean (and Red Sea) *Diogenes pugilator*, Roux. Nobili has recorded this species from Singapore.

Troglopagurus, Henderson.

Troglopagurus, Henderson, Trans. Linn., Soc., Zool., (2) V, 1893, p. 421.

Carapace elongate, broadened posteriorly, well calcified in front of the cervical groove and in the neighbourhood of the cardiac region. Rostrum obsolescent.

Abdomen well developed, soft, spirally coiled; the terga indistinct and widely separated.

Eyestalks moderately slender, ophthalmic scales large, rather slender, approximated. Antennal acicle short, robust: flagellum setose.

External maxillipeds fairly well approximated at base: the exopodites of all three pairs of maxillipeds are flagellate: the endopodite (palp) of the 1st pair of maxillæ non-flagellate.

Chelipeds dissimilar and unequal, the left being greatly the larger: the hands are tomentose, the fingers open and close in a nearly vertical plane, and the finger-tips are calcareous and acuminate.

The 4th pair of legs are subchelate, and the 5th pair chelate: in both distally, on the outer surface, is the usual pavement of imbricating granules, as there is also on both rami of the caudal appendages.

The abdominal appendages, in addition to those that form the tail-fan, are 4 in number (somites 2—5) and are placed on the left side: in the male they are small and uniramous; in the female they are large, and the first 3 are biramous. The caudal appendages are better developed on the left side than on the right.

The gills are phyllobranchiæ, and are 13 in number on either side, disposed as in *Paguropsis*, *Paguristes*, *Calcinus*, *Clibanarius*, and *Diogenes*

Troglopagurus, as far as is known, is restricted to Oriental seas between the Gulf of Aden and Singapore. Of the three known species one is said to inhabit crevices in coral, and another lives in broad-mouthed shells which in many cases are far too big (relatively to the size of the animal) to be portable.

Key to the species of Troglopagurus.

I. Antennal acicle truncate; anterior edge of ophthalmic scales spinulose throughout — — — — *T. manaarensis.*

II. Antennal acicle not truncated: only the antero-internal angle of the ophthalmic scales spinose; outer surface of left hand covered with a dense mat of hairs: —

1. Antennal acicle acute: lower border of left hand sinuous *T. jousseaumii.*
2. Antennal acicle hardly acute; lower border of left hand not sinuous — — — ... *T. jubatus.*

1. Troglopagurus manaarensis, Henderson, Tr. Linn., Soc., Zool., (2) V. 1893, p. 421, pl. xxxix, fig. 9 11

The Indian Museum possesses no specimens of this species, which was discovered by Mr. E. Thurston in small cavities in coral, in the Gulf of Manaar.

2. Troglopagurus jousseaumii, Bouvier. Plate V., fig. 6.

Troglopagurus jousseaumii, Bouvier, Bull. Mus. d'Hist. Nat. Paris, 1897, pp. 231, 232, fig. 6.

Carapace moderately elongate: region in front of the cervical groove marked with numerous transverse serrulate and setose ridges. Rostrum almost obsolete, not so prominent as the antennal angles of the carapace.

Eyestalks moderately slender, not quite as long as the anterior border of the carapace, reaching just beyond the base of the terminal joint of the peduncle of the antennules and rather beyond the middle of the same joint of the antennal peduncle. Ophthalmic scales elongate-triangular, with 3 or 4 spines at the antero-internal angle.

The antennal peduncle hardly reaches half-way along the terminal joint of the antennular peduncle. Antennal acicle acute, not reaching to the middle of the penultimate joint of the peduncle, its inner edge spinulose: flagellum more than half again as long as the carapace, thickly setose to the tip.

Left cheliped vastly more massive than the right, about $1\frac{1}{3}$ times as long as the carapace: the under surface of the merus and the outer surface of the palm and fingers are concealed by a thick coat of long coarse matted hair: the merus has the upper border serrulate and the lower outer border sharply spinose: the upper and the distal borders of the carpus are spinose, and there are a few scattered spines or tubercles on the outer surface also: the palm is broader than long, its lower border is oblique and makes with that of the fixed finger a sinuous curve; its upper border, and that of the dactylus, is spinose, its lower border and that of the fixed finger is serrulate or granulous: the outer surface of the hand and fingers is studded with little tubercles from which the tufts of long hairs spring.

The right cheliped is slender, and reaches the base of the left dactylus ; all its joints are setose, the upper part of the hand being hidden in a mat of hair : the upper border of the carpus and of the hand is serrulate, but the outer surface of these joints is smooth except for a faint longitudinal broken line of low elevation.

The 2nd and 3rd legs slightly surpass the left cheliped : on both sides of the body they are setose, but those of the left side are very much more abundantly so than those of the right, and the setæ on the posterior surface of the long joints of the 3rd left leg form a dense mat as on the left hand : in both pairs the dactyli are much longer than the propodites. When denuded the legs are unarmed, except for a terminal spine at the far end of the anterior border of the carpus.

Length of carapace of largest specimen 19 millim.

Colours in spirit : pinkish yellow, chelipeds mottled and reticulated with red and white, the legs also but less extensively and less vividly.

$\frac{5754}{9}$: $\frac{4290-4}{10}$.	Off Malabar Coast, 28 fath.	"Investigator."
$\frac{4295}{10}$.	Off coast of Gujerat, 44 fath.	
$\frac{4730}{10}$.	Persian Gulf, 53 fath.	

Cancellus, Edw.

Cancellus, Milne Edwards, Ann. Sci. Nat., Zool., (2) VI. 1836, pp. 262, 286, and Hist. Nat. Crust. II. 1837, p. 243: A. Milne Edwards and Bouvier, Bull. Soc. Philomath. Paris, (8) III. 1891, p. 66: Ortmann, in Bronn's Thier Reich, Malacostraca, p. 1146.

Gryllopagurus, Zietz, Trans. Roy. Soc. S. Australia X. (1887), 1888, p. 298.

Body squat ; carapace not broadened posteriorly, strongly calcified except in the branchial regions. Rostrum broad, not very prominent.

Abdomen well developed, soft, simply flexed, not coiled, symmetrical.

Eyestalks of good length, slenderish ; ophthalmic scales well separated. Antennal acicle well formed ; flagellum short.

Mouth parts as in *Paguristes* and *Clibanarius*, except that there is no flagellum to the endopodite of the 1st maxillæ. External maxillipeds approximated at base.

The chelipeds and 2nd pair of legs are profoundly modified to form an operculum to the hole in which the animal lives : their three terminal joints are trihedral and are set at right angles with the merus, and have their upper (now anterior) face concave or canaliculate by reason of the salience of one

or more of its borders. To form the operculum the two wrists and hands—whose inner edge is quite straight—are in close apposition, and the three corresponding joints of the 2nd pair of legs are curved so as to make close contact with the convex outer edge of the wrist and hand. The 3rd pair of legs resemble the 2nd in all respects, except that they are slenderer and have their upper (anterior) facets less well defined on the inner edge, and narrower : they form a support to the operculum though concealed behind it.

The fingers of the chelipeds are short and blunt, and move in an almost perpendicular plane.

The 4th pair of legs are broadly subcheliform and the 5th pair cheliform : on the outer side of both, near the tip, as also in the same position on both rami of the tail-fan, is the usual patch of imbricating corneous granules.

In the male there are no abdominal appendages except those of the tail-fan, which are quite symmetrical, as also—or nearly so—is the telson. In the female besides these, there are 4 unequally-biramous appendages on the left side.

Milne Edwards and Bouvier describe the gills (which are phyllobranchiæ) as 14 in number on either side, a pleurobranch being present on somite XIV, as in *Pagurus ;* but of the 2 arthrobranchiæ of the external maxillipeds one is a rudiment and the other is non-plumose.

Species of this genus have been found in the Gulf of Mexico and Caribbean Sea (30 to 130 fathoms) ; off Cape Verde Islands and off the west coast of equatorial Africa ; in Indian Seas (to 32 fathoms) ; off the coast of S. Australia ; and off the Gulf of Panama (66 fathoms). Of the Indian species one is hardly distinguishable from a species from Cape Verde Islands, this being only one of the numerous correspondences between the sub-littoral fauna of Indian Seas and that of the Atlantic approaches of the Mediterranean.

1. Cancellus investigatoris, n. sp. Plate V., fig. 8.

I have compared the single specimen representing this species with a specimen of *C. parfaiti*, Edw. and Bouv., in the British Museum, and I find that the difference between the two is extremely slight.

Carapace subcylindrical, its breadth in any part is more than three-fourths of its length in the middle line. Cardiac region remarkably broad and short. Rostrum broadly triangular, not surpassing the antennal angles of the carapace.

Eyestalks shorter than anterior border of carapace, longer than antennular peduncles, the eyes occupy about one-sixth of their length ; ophthalmic scales small, setose, fairly well separated.

Antennal peduncle not much more than half the length of the eyestalk : flagellum not much more than half the length of the carapace : acicle reaching nearly to the middle third of the terminal joint of the peduncle, bifid at tip, with a spine on its outer border.

Chelipeds short and massive : the raised edge of the carpal facet broadly 3-lobed, the straight inner edge of the palm cut into 6 or 7 lobules, the convex outer edge of the palm very obscurely rugulose ; fingers setose, the dactylus little more than half the length of the palm. The opercular surface of the chelipeds, as of the corresponding parts of the 2nd pair of legs, is very closely and finely granular, and the edges are setose. No patch of striæ on the inner surface of the palm.

Second pair of legs a little longer than the chelipeds, which they embrace : their edges, as also of the 3rd pair, setose. The edge of the carpal facet is three-lobed, the raised outer edge of the propodite is 5-lobed, and the same edge of the dactylus is unevenly serrulate : the inner edges of these three joints are not lobulated : the dactylus is shorter than the propodite.

Third pair of legs a little longer than the 2nd pair : only the convex outer edge of the propodite is distinctly lobulate : the dactylus, though it looks shorter, is about the same length as the propodite.

In the 4th pair of legs the propodite is subcircular, and the dactylus minute.

Colours in spirit : faint pinkish, with crossbands of darker red on the chelipeds and legs : finger-tips black : claws of dactyli brown.

Length of carapace about 9 millim.

$\frac{1629}{7}$ Off S. E. coast of Ceylon, 32 fath. "Investigator."

Pagurus Fabr.

Pagurus (part) Fabricius, Entomologia Systematica Supplement, 1798, p. 411 : Bosc, Hist. Nat Crust II. 1802, p. 63 : Latreille, Hist. Nat. Crust. et Ins. VI. 1803, p. 137 : Olivier, Encycl. Method. VIII. 1811, p. 636 : Risso, Crust. Nice, 1816, p. 53 ; and Hist. Nat. Europ. Mérid. V. 1826, p. 37 : Lamarck, Hist. Nat. Anim Sans-Vertebr. V. 1818, p. 219 (2nd Edit. 1838 p. 390) : Desmarest, Dict. Sci. Nat. XXVIII. 1823, p. 286 ; and Consid. Gen. Crust., 1825, p. 175 : Roux, Crust. Médit 1828 : Milne Edwards, Ann. Sci. Nat., Zool., (2) VI. 1836, p. 263 ; and Hist. Nat. Crust. II 1837, p. 213 ; and Ann. Sci. Nat., Zool., (3) X. 1848, p. 59 : DeHaan, Faun. Japon. Crust., 1849, p. 202.

Pagurus, Dana, U. S. Expl. Exp. Crust. pt. I. 1852, p. 449 : Stimpson, Proc. Acad. Nat. Sci. Philad (1858) 1859, p. 233 : Heller, Crust. sudl. Europ., 1863, p. 174 : Miers, Cat. Crust. New Zealand, 1876, p. 65 : Boas Vidensk. Selsk. Skr. 6 Raekke, nat. o. math., Afd. I 2. 1880, p 190 : Haswell, Cat Austral Crust., 1882, p. 155 : Henderson, Proc. Roy. Soc. Edinb. IX., pt. I, 1886, p. 67 ; and Challenger Anomura, 1888, p. 55 : Ortmann, in Bronn's Thier Reich.

Malacostraca, p. 1146: Milne Edwards and Bouvier, Mem. Mus. Comp. Zool. Harvard, XIV No. 3, 1893, p. 161: Stebbing, Hist. Crust. 1893, p. 160: Young, Stalk-eyed Crust. W. Indies 1900, p. 364.

Dardanus, Paulson, Mary Rathbun, Proc. U. S. Nat. Mus. 1903, p. 33.

Pagurias, J. E. Benedict, Bull. U. S. Fish. Comm. XX. 2, for 1900, p. 141.

Carapace usually but not always elongate, broadened posteriorly, strongly calcified in front of the cervical groove and in the neighbourhood of the cardiac region. Rostrum absent, ophthalmic somite exposed.

Abdomen well developed, spirally coiled, soft, with the terga widely separated.

Eyestalks stout; ophthalmic scales large and widely separated. Antennal acicle well formed: the flagellum long and non-setose.

External maxillipeds approximated at base: the exopodites of all three pairs of maxillipeds have a well-developed flagellum: the endopodite (palp) of the 1st maxillæ non-flagellate.

With few exceptions the chelipeds are dissimilar and unequal, the left being greatly the larger: the finger tips are corneous, and (especially those of the smaller cheliped) somewhat spooned: the fingers open and close in an obliquely-vertical plane.

The fourth pair of legs are subchelate, and the fifth pair chelate: in both, on the outer surface, near the tip, there is a patch of imbricating corneous granules—as there is also on both rami of the tail-fan.

The abdominal appendages, in addition to those that form the tail-fan, are 4 in number (on somites 2—5) and are placed on the left side: in the male they are small and uniramous—the posterior ramus being a mere papilla: in the female the first three are large and triramous, and the fourth is small and resembles that of the male. In both sexes there is commonly found, behind the third abdominal appendage, but more ventral in position, a setose fleshy or partly calcified spur. The telson, and other parts of the tail-fan are more developed on the left side than on the right.

The branchiæ are phyllobranchiæ, and are 14 in number on either side, arranged as in *Pylocheles*.

The genus *Pagurus*, as restricted, is characteristic of the tropical littoral of the eastern hemisphere. The majority of *Paguri* are found in the Indo-Pacific, between the parallels of 25°N. and 20°S, and the meridians of 40°E. and 140°W., one species (*P. sinistripes*), however, occurring at Panama. Outside this area the genus is represented, but poorly, in the West Indian region, and in the Mediterranean and its approaches, from Setubal to Senegambia,—one of the species found here (*P. arrosor*) having a most

remarkable range from the West Indies and Brazil, through the Mediterranean and its Atlantic approaches, to Japan and S. E. Australia.

One extremely doubtful species (*P. fasciatus*) has been reported, but only once, from Falmouth in the English Channel,—this, as far as I can ascertain, being the only true *Pagurus* found at a great distance from the tropics.

Though several species of *Pagurus* range into depths of 20 to 50 fathoms, the only one that truly belongs to the sublittoral fauna is *P. arrosor* which may go down to close upon 200 fathoms, a fact which adds some significance to its remarkable geographical distribution.

Key to the Indian species of the genus Pagurus.

1. The eyestalks reach very nearly to, or even surpass, the end of the antennular peduncles: the eyes never occupy as much as one-third of the terminal joint of the eyestalk :—

   A. The greatest breadth of the carapace across the branchial regions is less than the length of the carapace in the middle line :—

      i. Left cheliped vastly larger and longer than the right :—

         a. The whole of the outer surface of the left hand is spinose :—

            a'. Outer surface of propodite of third left leg spinose :—

               a''. Chelipeds and legs very hairy : hand of left cheliped not inclined inwards :—

                  x. Carapace and legs copiously ocellated — *P. punctulatus*.

                  y. Carapace and legs not ocellated — *P. vulnerans*.

               b''. Chelipeds and legs bare, or sparsely setose ; hand of left cheliped strongly inclined inwards ... ... *P. wood-masoni*.

            b'. Outer surface of propodite and dactylus of third left leg with regular, transverse squamiform markings ... ... *P. setifer*.

         b. Except for a few spinules along its upper margin the outer surface of the left hand is granulous ... *P. fabimanus*.

      ii. Left cheliped decidedly larger but not much longer than the right: the joints of the distal half of the antennal flagellum strongly gibbous ; (chelipeds and legs hairy and spinose) — — ... ... *P. euopsis*.

   B. The greatest breadth of the carapace across the branchial regions is equal to the length of the carapace in the middle line : left cheliped moderately larger than the right : (chelipeds and legs hairy : outer surface of last two joints of third left leg transversely striated) — .. ... *P. guttatus*. p. 89.

II. The eyestalks, which are coarse and broad, do not nearly reach to the end of the antennular peduncle: the eyes occupy a third or more of the terminal joint of the eyestalk:—

A. Left cheliped vastly larger than the right:—

i. Outer surface of left hand closely covered with imbricating scale-like tubercles ... ... *P. imbricatus.*

ii. No squamiform tubercles present:—

a. Inner border of upper surface of dactylus of left cheliped sharply cristiform ... ... *P. deformis.*

b. Upper surface of dactylus of left cheliped bearing longitudinal rows of granules only:—

a'. Outer edge of upper surface of propodite of third left leg well defined, subcristiform ... ... *P. varipes.*

b'. Outer edge of upper surface of propodite of third left leg hardly defined:—

a''. Upper part of outer surface of left hand with 2 or 3 raised longitudinal rows of granules or small tubercles, lower part smooth ... *P. asper*, DeHaan.

b''. Whole outer surface of left hand uniformly granulous ... ... *P. dearmatus.*

B Both chelipeds are of exactly the same size and form ... *P. hessii.*

1. Pagurus punctulatus, Olivier. Plate VIII., fig. 1.

Cancer megistos, Herbst, Krabben III. iv., p. 23, pl. xi., fig. 1, 1804.

Pagurus megistos, Olivier, Encycl. Meth. VIII., p. 639, 1811.

Pagurus punctulatus, Olivier, Encycl. Meth. VIII., p. 641, 1811: Desmarest, Dict. Sci. Nat. XXVIII., p. 289, 1823, and Consid. Gen. Crust., p. 179, 1825: Quoy & Gaimard, Voy. Uranie et Physicienne, p. 528, pl. lxxviii., fig. 2, 1824: Milne Edwards, Ann. Sci. Nat., Zool., (2) VI. 1836, p. 273, and (3) X. 1848, p. 61, and Hist. Nat. Crust. II., p. 222, 1837: Randall, Journ. Acad. Nat. Sci. Philad. VIII. 1839, p. 132: Dana, U. S. Expl. Exp., Crust., pt. I., p. 451, pl. xxviii., fig. 4 *a-b*, 1852: Stimpson, Proc. Ac. Nat. Sci. Philad. 1858, p. 246: Heller, Novara Crust., p. 87, 1865: Hilgendorf in v. d. Decken's Reisen in Ost—Afr. III. i., p. 95, 1869, and MB. Ak. Wiss. Berlin, 1878, p. 814: Miers, P. Z. S. 1877, p. 138, and Phil. Trans. Vol. 168, 1879, p. 491, and Ann. Mag. Nat. Hist. (5) V. 1880, p. 374, and Voy. H. M. S. Alert, pp. 519, 555, 1884: Richters in Mobius, Meeresfauna Maurit., p. 160, 1880: Lenz u. Richters, Abh. Senck. nat. Ges. XII. 1881. p. 426: Haswell, Cat. Austr. Crust., p. 155, 1882: F. Muller, Verh. nat. Ges. Basel, VIII. 1886. p. 472: de Man, Arch. f. Nat. LIII. i., 1887, p. 429, and Journ. Linn. Soc., Zool., XXII. 1888, p. 225: Ortmann, Zool. Jahrb., Syst., etc., VI. 1892, p. 286, and in Semon's Zool. Forschungsr. in Austral., etc. (1894). Crust., p. 30: J. R. Henderson, Trans. Linn. Soc., Zool., (2) V. 1893, p. 419: Etheridge, Mem. Austral. Mus., No. 2, 1889, pp. 35, 36: Borradaile, P. Z. S., 1898. p. 461, and Stomap. & Macrura of Willey's Exp., p. 425, 1899: Nobili, Ann. Mus. Civ. Genov. (2) XX. 1899, p. 248: Schenkel, Ver. nat. Ges. Basel, XIII. 1902, p. 568: Lanchester, P. Z. S. 1902, p. 364.

Carapace not greatly depressed, its greatest breadth, across the branchial regions, is about seven-tenths of its length in the middle line; with tufts of red or yellow bristles in the vicinity of the anterior and antero-lateral borders.

Eyestalks subcylindrical, very little broadened distally, about five-sixths as long as the anterior border of the carapace, about the same length as the antennular peduncles and much longer than the antennal. The eyes do not take up a fourth of the terminal joint of the eyestalk.

Antennal acicle setose and slightly spinulose, only just overlapping the base of the last joint of the antennal peduncle.

The chelipeds and crawling legs, especially in their last 3 joints and on the extensor surfaces, are thickly beset with tufts of long red, or red-and-white, or brownish-yellow bristles, and with black-tipped thorn-like spines: in addition, there are stronger teeth along the crest-like inner border of the ischium and merus and along the upper border of the wrist and hand of the left cheliped.

The left cheliped is vastly larger than the right, its length measured in a straight line, as a chord, being about half again as long as the carapace measured in the middle line. The crawling legs on the right side are the longer, and reach well beyond the tip of the left cheliped. The greatest breadth of the subcylindrical propodite of the 3rd left leg is between two-fifths and one-third the greatest length.

Colours in spirit: carapace, external maxillipeds and chelipeds and legs red (much lighter on the carapace) with very numerous white or bluish-white-centred, black-edged ocelli: eyestalks maroon.

This is the largest species of the true *Paguridæ* of the Indian fauna: a specimen brought by Mr. Stanley Gardiner from the Maldives has a carapace more than 70 millim. ($2\frac{4}{5}$ inches) long.

Distribution: from the Red Sea and east coast of Africa eastwards through the Indo-Pacific to the Liu-Kiu Islands, Australia, and the Sandwich Islands; that is to say, from about 40°E. to about 150°W., and from about 28°N. to about 30°S.

355.	Andamans.	J. Wood-Mason (12).
$\frac{8150.}{6}$	Mergui.	Dr. J. Anderson (2).
$\frac{4251}{10}$.	Suhelipar, Laccadives.	"Investigator" (4).

This species is very common in the tidal pools of coral reefs and islands in Indian Seas.

2. Pagurus vulnerans, Thallwitz.

Pagurus vulnerans, Thallwitz, Abh. u. Ber. K. Zool. etc. Mus. Dresden, 1890-91 No. 3, p. 33.

I regard this as probably a variety of *P. punctulatus*, from which it differs in the following particulars :—

(1) the carapace is more depressed, and

(2) the eyestalks are as long as its anterior border ;

(3) the breadth of the propodite of the 3rd pair of legs is half its length ;

(4) the colour of well preserved spirit specimens is uniform light yellowish grey, the bristles light yellow, and the thorns on the chelipeds and legs are tipped with brown.

Distribution : off New Guinea (south) : Bay of Bengal : Persian Gulf.

$\frac{4251.}{10}$	Off Coromandel coast 20 fath.	"Investigator" (2).
$\frac{4340.}{10}$	Persian Gulf.	W. T. Blanford.

3. Pagurus setifer, Edw., Henderson. Plate VIII., fig. 3.

Pagurus setifer, Milne Edwards, Ann. Sci. Nat., Zool., (2) VI. 1836, p. 274, and Hist. Nat Crust. II., p. 225, 1837 : De Haan, Faun. Japon., Crust., p. 209, 1849 : Muller, Verh. Nat. Ges. Basel, VIII. 1886, p. 472. See also de Man, Abh. Senckenberg. Nat. Ges., XXV. 1902, p. 739.

Pagurus sculptipes, Stimpson, Proc. Ac. Philad. (1858) 1859, p. 246 : Ortmann, Zool. Jahrb., Syst. VI. 1892, p. 287, and X. 1897, p. 275 : Doflein, Abh. K. Bayer. Akad. XXI. iii. 1902, p. 646.

Pagurus pavimentatus, Hilgendorf, MB. K. Akad. Berlin, 1878, p. 816, pl. iii., fig. 1-5.

In form and proportions this species resembles *P. punctulatus*, but is easily diagnosed by the following characters :

The eyestalks are quite as long as the anterior border of the carapace and are slightly longer than the antennular peduncles.

The joints of the distal half of the antennal flagellum have the antero-internal angle produced.

The chelipeds and legs have the same proportions and are beset with the same black-tipped thorn-like spines, but the bristles are very short and fine and do not in the least hide the spines and surface sculpture. In the hand of the large (left) cheliped the bristles form little wreaths round the bases of the spines, and along the lower border the spines are grouped in palisade fashion (best seen from the inside). The same sort of toothed or crenulated sculpture occurs along the edges of the two last joints of the third left leg ;

and the form and sculpture of the outer surface of these two joints is characteristic: they are broadened (the greatest breadth of the propodite being about three-fifths of its length) and are longitudinally traversed by a spinose carina: the surface on either side of the carina—but especially on the dorsal side—is hollowed, and is very elegantly tesselated by a series of deep-cut and extremely regular transverse grooves.

Colours in spirit: carapace yellowish, with some scattered rosy patches; chelipeds and legs yellow and rusty red, the red tending to form cross-bands, which are best marked on the merus and carpus.

Length of carapace (of largest specimen in I. M. collection) nearly 35 millim.

Distribution: from the coast of E. Africa eastwards to Japan, *i.e.*, from about 40°E. to about 130°E., and from about 30°N. to about 12°S.

1266.	Off Tuticorin (G. of Manar), 5 fath.	"Investigator."
$\frac{1627-8}{7}$.	Off S. coast Ceylon, 32 fath.	"Investigator."
$\frac{2741-2}{7}$.	Off Cheduba (Arakan coast), 7 fath.	"Investigator."
$\frac{5752-3}{9}$.	Off Malabar coast, 28 fath.	"Investigator."
[$\frac{7294}{6}$.	Hongkong.	R. Hungerford.]

4. Pagurus fabimanus, Dana. Plate VIII., fig. 2.

Pagurus fabimanus, Dana, Proc. Ac. Nat. Sci. Philad. 1852, p. 270, and U. S. Expl. Exp. Crust., pt. I., p. 454, pl. xxviii., fig. 7 *a—e.*, 1852; Hilgendorf, MB. K. Ak. Berlin, 1878, p. 819. Whitelegge, Mem. Austral. Mus. III. 1897, p. 142.

This small species seems to be most closely related to *P. setifer* (= *sculptipes*).

Carapace somewhat depressed, its breadth across the branchial regions about three-fourths its length in the middle line; almost bare of setæ.

Eyestalks subcylindrical, slightly dilated anteriorly, as long as the front border of the carapace and longer than the antennular peduncles: the eyes occupy about a quarter of the length of their terminal joint.

Antennal acicle short, hardly reaching the end of the penultimate joint of the antennal peduncle. The joints of the distal half of the antennal flagellum have the antero-internal angle produced.

The smaller cheliped and the dactyli of the legs alone are *decidedly* hirsute. Left cheliped vastly the larger, its length in a straight line (chord)

is half as long again as the sagittal line of the carapace : the lower border and outer distal angle of the merus, and the upper border of the wrist, hand, and dactylus are spinulose ; the lower border of the hand is well defined, entire or crenulate ; otherwise the large cheliped to the naked eye is smooth.

The legs of both sides reach beyond the tip of the larger cheliped : under a lens the legs are finely scabrous only, not spinulose.

The last two joints of the third left leg have the scabrous outer surface flattened and its margins sharply defined, the outer surface of the dactylus is also longitudinally grooved : the greatest breadth of the propodite is more than half its length. In form, but not in sculpture, these joints resemble those of *P. setifer*.

Colours as in *P. setifer*, but the rusty-red patches are fainter.

Carapace about 10 millim. in length.

Distribution : Mozambique, Laccadives and Maldives, Philippines, Fiji, Tongatabu, Funafuti.

$\frac{4666}{10}$. Minnikoy. J. Stanley Gardiner.

5. Pagurus wood-masoni, n. sp. Plate IX., fig. 3.

Carapace decidedly depressed, its greatest breadth across the branchial regions about eleven-twelfths its length in the middle line ; almost bare of setæ.

Eyestalks depressed, much broadened distally, not quite as long as the front border of the carapace, slightly longer than the antennular peduncle. The large reniform eyes occupy between a third and a fourth of the length of the terminal joint of the eyestalk. The serrated antennal acicle considerably overlaps the last joint of the antennal peduncle.

Chelipeds and legs sparingly setose. Left cheliped vastly the larger, its length measured in a straight line (chord) is about twice that of the sagittal line of the carapace : its hand, which is long and comparatively narrow, is inclined inwards, somewhat as in *Diogenes miles* : the merus has its borders spinose, especially the cristiform inner border ; the wrist has its inner border and the lower part of its outer surface spinose ; the hand and dactylus are abundantly spinose on the outer and upper surface, the spines on the inner border of the hand being enlarged and those on the lower border forming a serrated crest.

The crawling legs on both sides surpass the tip of the large cheliped, those of the right side being somewhat the longer : in all the carpus is

spinose distally, the propodite and dactylus are spinose along the upper surface, and the outer surface of the dactylus is longitudinally grooved. The propodite of the third left leg is half as broad as long and has its outer surface spinose.

Colours in spirit: yellowish white, with faint pink cross-patches on the eyestalks, and merus, carpus, and propodite of the chelipeds and legs.

Length of carapace 15 millim.

Inhabits broad shells, such as *Strombus* and *Oliva*.

Distribution: Maldives and Andamans.

450.	Macpherson's Straits, Andamans.	J. Wood-Mason.
$\frac{4328-30}{10}$	Andamans.	J. Wood-Mason & F. Stoliczka.

6. Pagurus euopsis, Dana. Plate IX., fig. 2.

Pagurus euopsis, Dana, Proc. Acad. Nat. Sci. Philad. 1852, p. 7, and U. S. Expl. Exp. Crust., pt. I, p. 452, pl. xxviii., fig. 6 *a—c*: Richters, in Möbius Meeresf. Maurit., p. 160, 1880: de Man, Archiv f. Naturges. LIII. 1887, i. p. 429: Henderson, Challenger Anomura, p. 58, 1888: Bouvier, Bull. Soc. Philom. (8) IV. 1891-92, p. 54: Ortmann, Zool. Jahrb., Syst., VI. 1892, p. 286, and in Semon's Forschungsr. in Austral., etc., p. 30, 1894: Zehntner, Rev. Suisse Ann. Mus. d' Hist. Nat. Geneve, II. 1894, p. 190: Borradaile, P. Z. S. 1898, p. 461, and Stom. and Macr. Willey's Exp., 1899, pp. 396, 425: Schenkel, Verh. Nat. Ges. Basel, XIII. 1902, p. 568.

Pagurus depressus, Heller, SB. k. Akad. Wien, XLIV. 1861, p. 248: Kossmann, Reise roth. Meer., Malacost., p. 76, 1877: Hilgendorf, MB. k. Akad. Berlin, 18 8, p. 814: Muller, Verh. nat. Ges. Basel, VIII. 1886, p. 472: de Man, Archiv f. Nat. LIII. 1887, i. p. 431.

Of two specimens taken by myself, at the same moment, in the lagoon of a small islet of the Andaman group, one corresponds with *P. euopsis*, the other with *P. depressus*.

Pagurus euopsis differs from *P. punctulatus*, which it resembles in the hairiness and spinosity of its chelipeds and legs, in the following particulars:—

(1) The carapace is more depressed, especially in the variety *depressus*.

(2) The eyestalks are much longer than the anterior border of the carapace, and are longer than the antennular peduncles, and are decidedly broadened distally.

(3) The antennal acicle is extremely short, not reaching to the base of the last joint of the peduncle. The joints of the distal half of the antennal flagellum have the antero-internal angle produced.

(4) The chelipeds and legs are thickly beset with stiff, long, brownish or red-and-white bristles as in *P. punctulatus*, but the thorn-like spines are much less numerous, on the legs especially.

(5) The disproportion between the chelipeds is very much less, especially in the female. In the female they are of nearly equal size; and in the male though the left is more massive, it is not much longer than the right. The legs on both sides reach well beyond the larger cheliped.

(6) The propodite of the 3rd left leg is more than half as broad as long, and has its outer surface flattened.

Colours in spirit: carapace with a large maroon patch on the front part of the gastric region, and with some similar patches spotted with white scattered elsewhere: chelipeds and legs slate-colour flecked with red and white; a broad maroon cross-band on the merus and carpus of both pair of crawling legs.

In the largest Indian specimen in the I. M. collection the carapace is 25 millim. (one inch) long.

Distribution: Red Sea and east coast of Africa, eastwards through the Indo-Pacific to Samoa; *i.e.*, from about 40° E. to about 170° W., and from about 20° N. to about 20° S.

$\frac{4664-65}{10}$.	Inglis Island, Andamans.	A. Alcock.
[297	"South Seas."	Purchased.]

7. Pagurus guttatus, Oliv., de Man. Plate IX., fig. 1.

Pagurus guttatus, Olivier, Encycl. Méth. VIII. 1811, p. 640: Quoy et Gaimard, Voy. Uranie, p. 533, pl. lxxix., fig. 3, 1824: Milne Edwards, Ann. Sci. Nat. Zool. (2) VI. 1836, p. 273, and Hist. Nat. Crust. II. 223. ?Guerin, Icon. Règne Anim., Crust., pl. xvi., fig. 2: Owen, Zool. H. M. S. Blossom, 1839, p. 82: Dana, U. S. Expl. Exp., Crust., pt. I., p. 451, pl. xxviii., fig. 3 *a—b*, 1852: Whitelegge, Mem. Austral. Mus. III. 1897, p. 143: de Man, Abh. Senckenberg. nat. Ges. XXV. 1902, iii. p. 738 (*ubi synon.*)

Pagurus setifer, Hess, Archiv f. Nat. XXXI. 1865, i. pp. 161, 172: Hilgendorf, MB. k. Akad. Berlin, 1878, p. 815, pl. iii., fig. 8: de Man, Archiv f. Nat. LIII. 1887, i. p. 433: Ortmann, Zool. Jahrb., Syst., VI. 1892, p. 287: Borradaile, P. Z. S. 1898, p. 460, and Stom. & Macr. Willey's Exp., 1899, pp. 396, 397, 425.

?*Eupagurus setifer*, Haswell, Cat. Austr. Crust., 1882, p. 154.

Carapace greatly depressed, its greatest breadth across the branchial regions equal to its length in the middle line: tufts of yellow bristles are present on its anterior and antero-lateral borders.

Eyestalks subcylindrical, somewhat broadened distally, hardly more than two-thirds the length of the front border of the carapace, slightly longer than the antennular peduncles: the eyes occupy less than a fourth of the length of their terminal joint.

Antennal acicle setose, very short—not nearly reaching the end of the penultimate joint of the antennal peduncle.

The chelipeds and legs are more or less beset, especially in their last two joints, with long yellow bristles, which are thickest on the lower part of the outer surface of the hand of the left cheliped, and form a particularly long and thick fringe along the inner and outer borders of the last two joints of the 3rd left leg. A large, nearly bald, polished patch forms a characteristic feature of the dorsal surface of the carpus of the chelipeds and crawling legs. As in *P. punctulatus*, thorn-like spines are concealed among the bristles of these appendages, but they are not nearly so numerous.

As in *P. euopsis*, the left cheliped is larger, but not vastly larger, and not much longer than the right; and the legs of both sides reach well beyond its tip.

The outer surface of the propodite and dactylus of the third left leg is broadened, longitudinally grooved near the upper margin, and very regularly and beautifully striated or tessellated transversely so as to simulate a series of scutes.

Colours in spirit: a few red and white patches at the anterior end of the carapace, and on the antennal peduncles and ophthalmic scales; external maxillipeds, chelipeds and legs purplish-crimson flecked with white; the characteristic bare patch on the carpus of the chelipeds and legs nearly white.

Distribution: from Mozambique eastwards as far as the Sandwich Is.: from about 40° E. to about 180° E., and from about 20° N. to about 34° S.

Length of carapace in a specimen from the "South Seas," 50 millim.

$\frac{4663}{10}$.	Minnikoy.	J. Stanley Gardiner.
[1293.	"South Seas."	Purchased.]

8. Pagurus deformis, Edw. Plate IX., fig. 4.

Pagurus deformis, Milne Edwards, Ann. Sci. Nat., Zool., (2) VI. 1836, p. 272, pl. xiv., fig. 2; and (3) X. 1848, p. 60; and Hist. Nat. Crust. II., p. 222, 1837: ?Randall, Proc. Acad. Philad. (1839) 1840, p. 133: Dana, U. S. Expl. Exp. Crust., Pt. I., p. 449, 1852: Stimpson, Proc. Ac. Philad. (1858) 1859, p. 246: A. Milne Edwards in Maillard's l'île Réunion, Annexe F, p. 13, 1862: Heller, Novara Crust., p. 86, 1865: Miers, Zool. Voy. Erebus and Terror, Crust., p. 3, pl. ii., fig. 3, 1875: Hilgendorf, SB. Ges. Nat. Fr. Berlin, 1878, p. 186 (hermaphroditism); and MB. k. Akad. Berlin, 1878, p. 818, pl. iii., fig. 6, 7: Richters, in Möbius Meeresf. Maurit., p. 160, 1880: Lenz u. Richters, Abh. Senck. nat. Ges. XII. 1881, p. 426: Muller, Verh. nat. Ges. Basel, VIII. 1886, p. 472: de Man, Arch. f. Nat. LIII. 1887, i. p. 435, and Journ. Linn. Soc., Zool., XXII. 1888, p. 225: Henderson, Challenger Anomura, p. 57, 1888, and Trans. Linn. Soc., Zool., (2) V. 1893, p. 420: Ortmann, Zool., Jahrb., Syst., VI. 1892, p. 288, and in Semon's Zool. Forschungsr. Austral., 1894, p. 31: Zehntner, Ann. Mus. d'Hist. Nat. Genève, II. 1894, p. 191, pl. viii., fig. 20: Borradaile, P.Z.S., 1898, p. 460, and Stom. and Macrura of Willey's Exp., 1899, p. 424.

Pagurus cavipes, White, P.Z.S., 1847, p. 122, and Ann. Mag. Nat. Hist. (2) I. 1848, p. 224.

Pagurus cultratus, White, List Crust. Brit. Mus., p. 60, 1848 (*fide* Miers).

Carapace not much depressed, its greatest breadth across the branchial regions about two-thirds its length in the middle line; hardly setose except on the antero-lateral margins.

Eyestalks depressed, much broadened distally, about two-thirds the length of the anterior border of the carapace: they reach about two-thirds of the way along the terminal joint of the antennular peduncle and are hardly longer than the antennal peduncle. Eyes broadly reniform, occupying from a half to two-fifths of the length of the eyestalk.

Antennal acicle serrulate and setose, reaching well beyond the base of the last joint of the antennal peduncle.

Legs and chelipeds very sparingly setose. Left cheliped vastly larger than the right, its length measured in a straight line (chord) about $1\frac{3}{5}$ times that of the carapace measured in the middle (sagittal) line: its merus has the lower border alate and strongly and irregularly serrate; its wrist has the upper and outer surface beset with strong teeth, of which those along the inner border are the largest; its short and deep hand bears two raised longitudinal rows of tubercles along its upper surface, in addition to a row of sharp teeth along the inner border and numerous interspersed granules, and its lower border is well defined and crenate, but the lower part of its outer surface is smooth: *the inner edge of the upper surface of its dactylus forms an upstanding crenulated crest.*

The crawling-legs of both sides are of nearly the same length, and reach beyond the tip of the larger cheliped; the upper surface of their three terminal joints is broken, or distantly tuberculous, not distinctly spinose.

The propodite and dactylus of the third left leg are characteristic: they have the *outer* edge of the *upper* surface raised into a thin, sharp, finely-crenulated, overhanging crest; and the outer surface of the dactylus is deeply concave.

Colours in spirit: biscuit-yellow, often with reddish cross-bands on eyestalks and legs.

Length of carapace nearly 30 millim. (in a specimen from the "South Seas" 38 millim.)

Numerous authors have commented on the fact that in this species the males possess orifices corresponding with the openings of the oviducts of the female.

Distribution: from the east coast of Africa eastwards to Tahiti; from about 40°E. to about 150°W., and from about 28°N. to about 18°S.

84	Andamans.	J. Wood-Mason.
1563.	Andamans.	J. Wood-Mason & F. Stoliczka (5).
$\frac{6718}{4}$.	Andamans.	R. D. Oldham (10).
$\frac{8152}{6}$.	Mergui.	J. Anderson.
[1289	"South Seas."	Purchased.]

9. Pagurus varipes, Heller. Plate IX., fig. 7.

? *Cancer pedunculatus*, Herbst, Krabben, III. iv., p. 25, pl. lxi., fig. 2, 1804.

Pagurus pedunculatus, Olivier, Encycl. Méthod. VIII. 1811, p. 647: Owen, Zool. Voy. H.M.S. Blossom, Crust., p. 83: Hilgendorf, MB. k. Akad. Berlin, 1878, p. 815: Ortmann, in Semon's Forschungsr. in Austral., etc., 1894, p. 31.

Pagurus varipes, Heller, Verh. zool. bot. Ges. Wien, XI. 1861, p. 22: SB. k. Akad. Wien, XLIV. 1861, p. 244, pl. i., fig. 1, and pl. ii., fig. 2, 3: Kossmann, Reise roth. Meer., Malacost., p. 75: de Man, Notes Leyden Mus. II. 1880, p. 184, and III. 1881, p. 129; and Arch. f. Nat. LIII. 1887, i. p. 436: Cano, Boll. Soc. Nat. Napoli, III. 1889, p. 265: Bouvier, Bull. Soc. Philom. (8) IV. 1891-92, p. 54: Henderson, Tr. Linn. Soc., Zool., (2) V. 1893, p. 420.

This species differs from *P. deformis* only in the following particulars:—

(1) the upper and outer surface of the dactylus of the left cheliped carries several longitudinal rows of polished granules, but there is no thin upstanding crest along the inner edge of the upper surface:

(2) the outer surface of the dactylus of the third left leg is longitudinally carinated near the lower margin:

(3) the male has no openings corresponding with those of the female.

Distribution: Red Sea, Mozambique, Persian Gulf, South India and Ceylon, Malay Archipelago.

1562.	Persian Gulf.	W. T. Blanford (3).
$\frac{4371}{10}$.	Persian Gulf, 48 fath.	"Investigator."

10. Pagurus asper, DeHaan. Plate IX., fig. 5.

Pagurus asper, DeHaan, Faun. Japon. Crust., p. 208, pl. xlix., fig. 4, 1849: Dana, U. S. Expl. Exp. Crust., pt. I., p. 450, 1852: Stimpson, Proc. Ac. Nat. Sci. Philad. (1858) 1859, p. 246: de Man, Notes Leyden Mus. III. 1881, p. 130: Müller, Verh. nat. Ges. Basel, VIII. 1886, p. 472: Ortmann, in Semon's Zool. Forschungsr. 1894, p. 31: Borradaile, Stomap. and Macrura of Willey's Exp., 1899, pp. 396, 397, 424.

Pagurus pedunculatus, Miers, Ann. Mag. Nat. Hist. (5.) V. 1880, p. 374: Haswell, Cat. Austral. Crust., 1882, p. 155.

? *Pagurus sigmoidalis*, Zehntner, Rev. Suisse Zool. Ann. Mus. Genèv. II. 1894, p. 192, pl. viii., fig. 19 *a-b*.

Dardanus Haani, Mary J. Rathbun, P.U.S.N.M. XXVI. 1903, p. 34.

Closely resembles *P. deformis* and *varipes*, but differs from them both in the form of the propodite of the third left leg, the outer border of the upper surface of which is not carinated and indeed is sometimes not defined in any way.

It agrees with *P. varipes*, and differs from *P. deformis*, in having longitudinal rows of granules, but no crest, on the upper surface of the dactylus of the left cheliped; in having the outer surface of the dactylus of the third left leg longitudinally carinated near the lower border; and in the absence of any traces of hermaphroditism in the male.

Distribution: Maldives, Ceylon, Malay Archipelago, Japan, Australia, Loyalty Is., Sandwich Is.

$\frac{2090}{7}$.	Gt. Coco I., Andamans.	A. Alcock (3).
$\frac{5526-7}{9}$.	Off Ceylon, 34 fath.	"Investigator."

11. Pagurus dearmatus, Henderson. Plate IX., fig. 6.

Pagurus dearmatus, Henderson, Challenger Anomura, 1888, p. 58, and Journ. A. S. B. LXV., 1896, pt. ii., p. 518.

Closely resembles *P. deformis*, *varipes*, and *asper*, but differs from them all in having (1) the whole upper and outer surface of the left hand closely and uniformly granulous, and the granules along the upper (inner) border hardly enlarged except near the carpal end, and (2) the outer surface of the propodite of the third left leg granulous and pitted.

It agrees with *P. deformis*, and differs from *P. varipes* and *asper*, in having the outer surface of the dactylus of the third left leg longitudinally canaliculate (not carinate).

It agrees with *P. varipes* and *asper*, and differs from *P. deformis*, in having the dactylus of the left hand granulous and non-carinate.

It agrees with *P. asper*, and differs from *P. deformis* and *varipes*, in the absence of a carina from the (hardly defined) outer border of the upper surface of the propodite of the third left leg.

Distribution: Maldives, Ceylon, Admiralty Is.

$\frac{1118}{10}$.	Off N. E. coast of Ceylon, 28 fath.	"Investigator."

12. Pagurus imbricatus, Edw. Plate IX., fig. 8.

Pagurus imbricatus, Milne Edwards, Ann. Sci. Nat., Zool., (3) X. 1848, p. 61: Miers, Cat. Crust. New Zealand, p. 66, 1876; and Zool. H. M. S. Alert, pp. 185, 264, 1884: Filhol, Crust. Nouv. Zel. Miss. l'ile Campbell III. ii. 1, p. 424, 1886: Henderson, Challenger Anomura, p. 57, 1888: Ortmann in Semon's Zool. Forschungsr, p. 30, 1894.

Carapace not much depressed, its greatest breadth across the branchial regions about five-sevenths of its length in the middle line; with a few setæ near the antero-lateral borders. The limits of the gastric region are rather faintly marked anteriorly and antero-laterally.

Eyestalks thick, depressed, much broadened anteriorly, nearly as long as the front border of the carapace, and reaching about three-quarters of the way along the terminal joint of the antennular peduncle. The reniform eyes take up about a third of the length of the terminal joint of the eye-stalk. Antennal acicle setose, well overlapping the base of the last joint of the antennal peduncle.

Left cheliped vastly larger than the right, its length measured in a straight line (chord) is more than half again as long as the sagittal line of the carapace, more than half its length being contributed by the very broad (deep) hand: its merus has the lower border cristiform and dentate; its carpus has the upper (inner) border spinose, and all the outer surface covered with imbricating squamiform tubercles, the free edge of which is evenly fringed with short close-set setæ: similar squamiform tubercles cover the whole outer surface of the hand and fingers, those on the fingers being smaller than those elsewhere.

In the smaller cheliped the wrist and hand are beset with long setæ and have a spinose upper border; but there are no imbricating tubercles, only a few squamiform markings, herein differing from those of *P. striatus*.

The crawling-legs of the left side reach to, those of the right side considerably beyond, the tip of the larger cheliped; the dactyli in all are setose. Elegantly-fringed squamiform tubercles, similar to those of the hand, cover the upper surface of the last two joints of the second and third left legs, and also the lower part of the outer surface of the merus and the whole of the broad flat outer surface of the propodite and dactylus of the third left leg, where they form two longitudinal rows of "scales."

On the right legs squamiform markings are present, but they do not form distinct "scales" as they do in *P. striatus*.

Colours in spirit: yellow, with a few small scattered reddish dots on the legs and anterior part of the carapace: the "scales" of the left cheliped and of the outer surface of the two terminal joints of the third left leg are, each and all, well defined by a red line.

The length of the carapace of the only specimen in the I. M. collection is 17 millim.

Distribution: New Zealand, Australia, Ceylon.

$\frac{1618}{7}$.	Off S. coast of Ceylon, 32 fath.	"Investigator."

13. PAGURUS HESSII, Miers. Plate VIII., fig. 4.

Pagurus hessii, Miers, Zool. H. M. S. Alert, pp. 185, 264, pl. xxviii., fig. A, 1884: Henderson, Trans. Linn. Soc., Zool., (2) V. 1893, p. 419: Lanchester, P. Z. S., 1902, p. 364.

Pagurus similimanus, Henderson, Challenger Anomura, p. 59, pl. vi., fig. 6, 1888.

Carapace not much depressed, its greatest breadth across the branchial regions is about two-thirds its length in the middle line.

Eyestalks depressed, much broadened distally, about three-quarters as long as the front border of the carapace, much shorter than the antennular peduncle, about as long as the antennal peduncle. Eyes reniform, occupying about two-fifths of the length of the terminal joint of the eyestalk.

Antennal scale projecting well beyond the base of the last joint of the antennal peduncle.

Chelipeds equal and in all respects similar, the fingers opening a little more obliquely than is usual in the genus. Their length measured in a straight line (chord) is about $1\frac{5}{8}$ths that of the carapace measured along the middle line. The edges of the merus are spinose: the outer surface of the carpus carries three longitudinal rows of spines: the outer surface of the hand and fingers is spinose, 3, $3\frac{1}{2}$ or 4 longitudinal rows of spines on the hand being very conspicuous. Longish bristles are present on the chelipeds and legs, but they do not hide the sculpture.

The crawling legs on both sides far surpass the tips of the chelipeds, those of the right side being identical in length, form, and sculpture with those of the left: their three terminal joints are strongly spinose dorsally.

The propodite of the 3rd left leg is hardly one-third as broad as long.

Colours in spirit: yellowish, the fingers and distal part of the palm bright brick-red.

Length of carapace about 20 millim.

Distribution: Maldives, B. of Bengal, G. of Martaban, Penang, Celebes Sea, 10 fath., Arafura Sea, 32—36 fath.

$\frac{1425-7}{7}$.	Off Arakan coast, 13 fath.	"Investigator."
$\frac{1831-2}{7}$.	Off Vizagapatam coast, 15—17 fath.	
$\frac{2356}{7}$.	Gulf of Martaban, 20 fath.	
$\frac{1821-5}{7}$: $\frac{2942}{7}$.	Off Ganjam coast, 28—30 fath.	
$\frac{2461-7}{7}$.	Off Ganjam coast, 35 fath.	
$\frac{4287-9}{10}$.	Off Bimlipatam, 23 fath.	

Aniculus, Dana.

Aniculus, Dana, U. S. Expl. Exp., Crust., pt. I. 1852, p. 460 : Stimpson, Proc. Ac. Nat. Sci. Philad. (1858) 1859, p. 234 : Miers, Cat. Crust. New Zealand, 1876, p. 64 : Stebbing, Hist. Crust. 1893, p. 60 : Thomson, Trans. N. Z. Inst. 1898, p. 184.

Differs from *Pagurus* in the following particulars :—

The chelipeds and next two pairs of legs are very regularly scutulated transversely like a sort of ringmail, the free edge of the scutes being elegantly ciliated.

The chelipeds are equal and similar, or very nearly so, and the fingers of both hands are short, blunt, and deeply spooned.

In the female the abdominal appendages are biramous, not triramous [and in the typical species (*A. aniculus*) in addition to the large foliaceous brood-flap, each of the first three appendages carries a large leaf-like bract which aids in forming the brood-pouch].

This small genus belongs to the Indo-Pacific, the species being found from East Africa to Panama.

Key to the Indian species of the genus Aniculus.

I. Carapace not depressed, much longer than broad :—

A. Eyestalks shorter than anterior border of carapace: frontal region, chelipeds, and legs remarkably hirsute — — *A. aniculus.*

B. Eyestalks longer than anterior border of carapace : not strikingly hirsute ... — — — *A. tenebrarum.*

II. Carapace flat as a pancake: its greatest breadth exceeds its length ... — — — — ... *A. strigatus.*

1. Aniculus aniculus, Fabr. Plate VII., fig. 6.

Pagurus aniculus, Fabr., Ent. Syst. II. 1793, p. 468 ; and Suppl. 1798, p. 411.

Cancer aniculus, Herbst, Krabben II. 1791, p. 37.

Pagurus aniculus, Bosc, Hist. Nat. Crust. II. 1802, p. 76 : Latreille, Hist. Nat. Crust. VI. 1803, p. 163 : Olivier, Encycl. Method. VIII. 1811, p. 640 ; Quoy and Gaimard, Voy. Uranie, 1824, p. 531, pl. lxxix., fig. 1 : Milne Edwards, Ann. Sci. Nat., Zool., (2) VI. 1836, p. 279, and (3) X. 1848, p. 63, and Hist. Nat. Crust., II. 1837, p. 230 : Owen, Zool. Blossom, 1839, Crust., p. 82 : De Haan, Faun. Japon. Crust. 1849, p. 209 : A. Milne Edwards, in Maillard's l'ile Réunion, 1862, Annexe F, p. 13.

Pagurus ursus, Olivier, Encycl. Method. VIII. 1811, p. 640 : Desmarest, Dict. Sci. Nat. XXVII. 1823, p. 289, and Consid. Gén. Crust. 1825, p. 179.

Aniculus typicus, Dana, U. S. Expl. Exp. Crust., pt. I., 1852, p. 461, pl. xxix., fig. 1 : Stimpson, Proc. Ac. Nat. Sci. Philad. (1858) 1859, p. 247 : Heller, Novara Crust. 1865, p. 87 : Miers, Cat. Crust. N. Z. 1876, p 64 ; and Phil. Trans. Roy. Soc. 1879, p. 491, and Ann. Mag. Nat. Hist. (5) V. 1880, p. 375 : Richters in Mobius, Meeresf. Maurit. 1880, p. 161 : Filhol, Crust. N. Z. in Miss l'ile Campbell, III. 2. 1, 1886, p. 424 : Cano, Boll. Soc. Nat. Napol. III. 1889, p. 265 : Ortmann, Zool. Jahrb., Syst., VI. 1892, p. 289 ; Whitelegge, Mem. Austral.

Mus. III. 1897, p. 144 : Borradaile, P. Z. S., 1898, p. 461 : Thomson, Tr. N. Z. Inst. 1898, p. 184.

Aniculus aniculus, Hilgendorf, in v. d. Decken's Reis. Ost. Afr. III i., 1869, p. 97, and MB. k. Akad. Berlin, 1878, p. 824 : Henderson, Tr. Linn. Soc., Zool. (2) V. 1893, p. 422 : Lanchester, P. Z. S., 1902, II., p. 364.

The anterior and antero-lateral parts of the carapace, the eyestalks and scales, the peduncles of both pairs of antennæ and the acicle, and the chelipeds and legs, are shaggy with tufts of long red-and-white and yellow bristles.

The greatest breadth of the carapace across the branchial regions (which are unusually well calcified) is about two-thirds its length in the middle line. A large triangular rostrum is present, which, however, does not reach to the base of the ophthalmic scales.

Eyestalks as long as the antennular peduncles, but shorter than the anterior border of the carapace : ophthalmic scales emarginate near apex and bifid at tip, approximated.

The antennal acicle just overlaps the base of the terminal joint of the peduncle : flagellum about as long as the carapace in the female, longer in the male.

Chelipeds equal and quite similar, about $1\frac{1}{3}$ times as long as the carapace : merus higher than long, its crest-like lower inner edge deeply notched to fit the lobe of the carpus in flexion : carpus and palm of hand higher than long : many of the scutes of the chelipeds, as of the 2nd and 3rd legs, have the free edge more or less adorned with little black thorns, or spinules, or granules.

The 2nd pair of legs are about a dactylus-length, the 3rd pair about half a dactylus-length, longer than the chelipeds : in both pairs the dactylus is almost as long as the propodite.

In the adult female each of the first three abdominal appendages is hidden by a large foliaceous bract or oostegite, and in addition there is a larger foliaceous brood-flap attached to the left side of the 4th somite : the 4th abdominal appendage of the female is minute, with one ramus rudimentary.

Colours in spirit : anterior half of carapace and peduncles of eyes and antennæ stained with red : legs and chelipeds yellow and red, with a broad band of darker red on carpus : finger-tips and claws of dactyli black.

Length of carapace 40 millim.

$\frac{4650}{10}$.	Rodriguez.	British Museum Exch.
1244.	Society Is.	Otago Museum.
1296.	"South Seas."	Purchased.

Though there are no Indian specimens in the collection, the species is recorded from S. India and the G. of Manaar by Henderson.

Distribution : from Mozambique eastwards, by way of the islands of the Indian Ocean, South India, and the Malay Peninsula and islands, to New Zealand and Japan, and thence through Oceania as far as the Paumotu Archipelago (about 145°W.). Closely related species occur at Panama.

2. ANICULUS TENEBRARUM, n. sp. Plate VII., fig. 5.

Only the wrist and hands and the three terminal joints of the legs are setose.

Greatest breadth of the carapace about two-thirds its length in the middle line. Rostrum broad, inconspicuous, not surpassing the antennal angles of the carapace.

Eyestalks slender, much longer than the anterior border of the carapace, and than the antennular peduncles; eyes small; ophthalmic scales spiniform, approximated

The antennal acicle, which is tipped with two or three long setæ, considerably overlaps the base of the terminal joint of the peduncle: the flagellum is about as long as the carapace.

Chelipeds equal, or the left a little the larger, quite similar, about $1\frac{1}{3}$ times the length of the carapace, with long stiff setæ (not nearly so numerous as in *A. aniculus*) on the wrist and hands: merus longer than high, its inner lower border entire; the free edges of the scutes of the wrist and hand are finely and evenly crenulate in more or less of their extent: fingers short and broad, with hoof-like tips.

The 2nd pair of legs are about a dactylus-length, the 3rd pair about half a dactylus-length, longer than the chelipeds, their three terminal joints carry long stiff setæ, which are most numerous on the dactylus. In both pairs the dactylus is about the same length as the propodite.

In the female the 4th abdominal appendage is as large as any of the others, all having both rami very well developed.

Colours in spirit: anterior half of carapace pink, eyestalks red, chelipeds and legs cross-striped light and darker red alternately, the tips of the four terminal joints of the legs white, finger-tips black, claws of dactyli dark brown.

Length of carapace not quite 10 millim.

$\frac{4304}{10}$. Off Cape Comorin, 102 fath. "Investigator" (2).

The chief difference between this little species and *A. aniculus* is that it is not nearly so shaggy, and that it has much longer eyestalks. It inhabits shells of *Tritonidea delicata* and of *Rana*.

3. ANICULUS STRIGATUS, Herbst. Plate VII, fig. 4.

Cancer strigatus, Herbst, Krabben, III. iv. 1804, p. 25, pl. lxi., fig. 3.

Pagurus strigatus, Olivier, Encycl. Méthod. VIII. 1811, p. 647 : Hilgendorf, MB. k. Akad. Berlin, 1878, p. 820, pl. ii., fig. 8 : Ortmann, Zool. Jahrb., Syst., VI. 1892, p. 285 : Bouvier, Bull. Soc. Philom, Paris, (8) IV. 1891-92, p. 54 : Borradaile, Stomap. and Macr. of Willey's Exped., 1899, p. 425 : Nobili, Boll. Mus. Torino, XVIII. 1903, No. 452, p. 15.

Aniculus strigatus, Henderson, Tr. Linn. Soc., Zool., (2) V. 1893, p. 422.

Not hirsute. Cephalothorax remarkably flat and broad. Carapace broader than long, its anterior margin almost straight.

Eyestalks as long as the anterior border of the carapace, longer than the antennular peduncles : ophthalmic scales separated, spiniform, with the tip sometimes bifid.

Antennal acicle spinulose, reaching nearly to middle of terminal joint of peduncle : flagellum about as long as carapace.

Chelipeds equal and similar (the left one sometimes a little larger than the other), a little longer than the carapace : the rings or scutes, like those of the legs, are quite unarmed : merus longer than high : a few short tufts of bristles on the fingers, which are not so coarse and broad as in other species of the genus and open and close in a plane that departs but very slightly from the horizontal.

The 2nd and 3rd legs surpass the chelipeds by a dactylus-length : the dactyli are hirsute on both edges, the other joints have only the ventral border more or less setose : in the 2nd pair the dactylus is a little longer, in the 3rd pair much longer, than the propodite.

In the female the 4th abdominal appendage is large and biramous, resembling the preceding appendages.

The sternum is exceedingly broad in consequence of the flattening of the body, and so the bases of the external maxillipeds are almost as much separated as they are in the *Eupagurinæ*. The flattening of the body corresponds with the nature of the habitation, which is a *Conus* shell with a chink-like mouth.

478.	Andamans.	J. Wood-Mason (2).
1589.	Cheduba, Arakan coast.	Marine Survey (2).
$\frac{8880}{6}$.	Pedro Shoal.	"Investigator."

Distribution : Mozambique and Gulf of Aden ; Malabar coast, G. of Manár, and Bay of Bengal ; Loyalty Is., Tahiti : (about 40° E. to about 150° W. and about 19° N. to about 18° S.)

EUPAGURINÆ, Ortmann.

Parapagurus, S. I. Smith.

Parapagurus, S. I. Smith, Trans. Connect. Acad. V. 1879, p. 50, and Bull. Mus. Comp. Zool., Harvard, X. 1882-83, p. 20: Henderson, Challenger Anomura, 1888, p. 85: Milne Edwards and Bouvier, Mem. Mus. Comp. Zool., Harvard, XIV. No. 3, 1893, p. 26, and Hirondelle Crust., Brachyures et Anomures, Monaco, 1894, p. 63: T. R. R. Stebbing, Hist. Crust. 1893, p. 166, and Marine Inv. S. Africa, Crust. 1900, p. 27: Holmes, Synops. Calif. Stalk-eyed Crust. 1900, p. 55: Young, Stalk-eyed Crust. Br. Guiana, etc., 1900, p. 385: Alcock, Cat. Indian Deep-Sea Crust. 1901, p. 216.

Carapace strongly calcified in front of the cervical groove, less strongly in the cardiac region, not much broadened posteriorly: rostrum broad and obsolescent.

Abdomen well-developed, soft, spirally-coiled or straight, but always non-symmetrical: the last tergum and the telson well-calcified, the first two terga very thin, the other terga hardly recognizable.

Eyestalks of moderate length and slenderness, eyes well developed: ophthalmic scales spiniform and widely separated.

Antennular peduncle, and especially its terminal joint, long: the upper flagellum of remarkable length, comparatively. Antennal acicle and flagellum long.

External maxillipeds widely separated at base: the exopodite of the 1st maxillipeds is non-flagellate. The endopodite (palp) of the 1st maxillæ has a rudimentary papillar flagellum.

The chelipeds are dissimilar and unequal, the right being vastly the larger: the fingers move in an obliquely-vertical plane, and the finger-tips are calcareous or minutely corneous.

The 2nd and 3rd pairs of legs are remarkably long, especially as to the dactylus, which is sabre-shaped and twisted. The 4th pair of legs are subcheliform and the 5th pair cheliform; in both there is the usual subterminal pavement-like patch of granules, as there is also on both rami of the tail-fan.

In the male the first two abdominal somites carry each a pair of uniramous appendages modified for sexual purposes, and the next three somites have on the left side only each a biramous appendage, of which one ramus is almost rudimentary. In the female, with the exception of the appendages that form the symmetrical tail-fan, there are no paired appendages, but each of the somites, II—V, carries on the left side only a biramous appendage, the last of which (somite 5) resembles the corresponding appendage of the male in having one ramus rudimentary.

In the female there is only one oviduct, and it opens on the coxa of the 3rd left thoracic leg.

The gills are trichobranchiæ, and are 11 in number on either side, disposed as follows :—a pair of arthrobranchiæ on each segment from the IXth to the XIIIth and a pleurobranch on somite XIII. Each gill-plume consists of four rows of filaments.

The species of *Parapagurus* live in cold water, and are found either in the great depths of the oceans (Atlantic, Indian, and Pacific) or in the colder parts of temperate seas : of the 8 species known, 6 are abyssal or sublittoral, and only two belong to the littoral zone.

Key to the Indian species of the genus Parapagurus.

I. Ophthalmic scales simple, acute :—

A. Adult large ; chelipeds thickly tomentose : eyestalks barely half as long as front border of carapace — ... *P. pilosimanus.*

B. Adult small : chelipeds not noticeably tomentose : eyestalks more than half as long as the front border of the carapace *P. minutus.*

II. Ophthalmic scales serrated at tip :—

A. Right cheliped about $3\frac{3}{4}$ times as long as the carapace, its palm twice as long as broad ... ... *P. andersoni.*

B. Right cheliped about $2\frac{2}{3}$ times as long as the carapace, its palm about as broad as long ... — ... *P. brevimanus.*

1. *Parapagurus pilosimanus*, S. I. Smith. Plate X., fig. 1.

Parapagurus pilosimanus, S. I. Smith, Trans. Connect. Acad. V, 1879, p. 51 ; and Proc. U. S. Nat. Mus. III, 1881, p. 428, and VI. 1883, p. 33, pl. v., fig. 3—5, and pl. vi., fig. 1—4 *a* ; and Bull. Mus. Comp. Zool. Harvard, X, 1882-83, p. 20, pl. ii, fig. 4 ; and Report U. S. Fish. Comm. 1884 [p. 10], and 1886 [p. 39] ; and Ann. Mag. Nat. Hist. (5), XVII, 1886, p. 188 : Pocock, Ann. Mag. Nat. Hist. (6) IV, 1889, p. 430 : A. Milne Edwards and Bouvier, Ann. Sci. Nat. Zool. (7) XIII, 1892, p. 204 ; and Mem. Mus. Comp. Zool. XIV, No. 3, 1893, p. 28 ; and Hirondelle Brach. et Anom. (Monaco, 1894), p. 64, pl. ix., fig. 1—17, and Hirondelle et Princesse Alice Crust. Decap. (Monaco, 1899), p. 54 ; and Crust. Decap. Travailleur et Talisman, Pt. I, 1900, p. 187, pl. vi., fig. 2, and pl. xxiv., fig. 1—3 : Caullery, Caudan Crust., p. 386, 1896.

Eupagurus jacobii, A. Milne Edwards, Bull. Mus. Comp. Zool. VIII, 1880, p. 42.

Parapagurus abyssorum, Henderson, Challenger Anomura, 1888, p. 87, pl. ix., fig. 2 : Wood-Mason, Ann. Mag. Nat. Hist. Feb. 1891, p. 199 : Faxon, Mem. Mus. Comp. Zool. XVIII, No. 15, 1895, p. 68 : Milne Edwards and Bouvier, Crust. Decap. Hirondelle et Princesse Alice, Monaco, 1899, p. 55, pl. i., fig 1, and Crust. Decap. Travailleur et Talisman, Pt. I., 1900, p. 191, pl. xxiv., fig. 4—6.

After carefully comparing Indian specimens, of which we have a large series, with two "Challenger" specimens from the East Atlantic and three specimens from the West Atlantic, I can find no constant differences between them.

Carapace with a few distant but regularly disposed tufts of setæ, its greatest breadth about three-fourths its length in the middle line. Rostrum broad, rounded off, little prominent.

Eyestalks dorsally setose, slightly inflated at base, barely half as long as the anterior border of the carapace, reaching a short way beyond the 1st joint of the antennular peduncle, and to or a short way beyond the penultimate joint of the antennal peduncle. Eyes small, more ventral than dorsal; ophthalmic scales simple, acute.

Antennular peduncle either nearly or quite as long as the carapace, more than half its length being contributed by the terminal joint, which is only moderately enlarged distally: the upper flagellum more than two-thirds the length of the terminal joint.

Antennal peduncle stout, barely reaching the end of the second joint of the antennular peduncle: acicle long, surpassing the peduncle, curved, setose, smooth or only faintly serrulate along the inner edge: the flagellum more than four times the length of the carapace.

Right cheliped from nearly $2\frac{1}{2}$ to 3 times the length of the carapace, all its long joints more or less clothed with a long soft copious tomentum, which is densest on the hand and often dense on the under surface of the merus and carpus: the joints are elongate, the carpus usually being slightly longer than the palm and decidedly longer than the merus, and the dactylus being as long as the palm. In the female the palm is nearly as broad (high) as long, in the adult male it is longer than broad, and in old males may be nearly twice as long as broad. The lower border of the ischium and merus is bluntly serrulate: the upper surface of the merus and dactylus and the upper and outer surfaces of the wrist and palm are studded with vesiculous or subacute granules.

The slender left cheliped reaches a short way beyond the carpus of the right; its joints are covered with a long soft tomentum which is particularly thick on the outer surface of the palm and neighbouring end of the wrist: the merus is nearly as long as the carpus and longer than the palm, the dactylus is longer than the palm: there are a few distant granules on the upper border of the wrist and palm only.

The 2nd and 3rd legs of both sides surpass the larger cheliped—the 3rd, which are the longer, by the greater part of the dactylus: their joints are compressed and are unarmed except for a tiny spinule at the far end of the anterior border of the carpus, the anterior border of the long joints being merely broken, or faintly rugulose, not serrate: the dactylus of the 2nd pair is as long as the two preceding joints, that of the 3rd pair is a little longer, the dactyli of both pairs being plumose distally.

Colour in the fresh state chiefly pink; in spirit yellow.

This hermit-crab generally lives in a portable house formed by a particular species of *Epizoanthus*. The zoophytes and the hermit-crab appear to begin as common tenants—inside and outside—of a small gastropod shell which ultimately by the growth-pressure of its occupiers becomes absorbed, so that the hermit-crab comes at last to lie in a spiral cavity of the coenosarc—now of a gristly consistence—of the zoophyte-colony: the life-partnership is a settled phase of an association which, in various looser forms, is of very common occurrence between hermit-crabs and zoophytes.

$\frac{6881}{9}$.	Bay of Bengal,	1997 fath.	"Investigator."
$\frac{6171}{9}$.	Laccadive Sea,	740 fath.	
$\frac{8750-51}{9}$.	,, ,,	1200 fath.	
$\frac{8755}{9}$.	,, ,,	705 fath.	
$\frac{3918}{10}$.	,, ,,	870—823 fath.	
$\frac{4571}{10}$.	,, ,,	930 fath.	
$\frac{1970-2000}{10}$.	Off C. Comorin	824 fath.	
$\frac{2422}{10}$; $\frac{2462}{10}$.	,, ,, ,,	836 fath.	
$\frac{3924-5}{10}$.	,, ,, ,,	1006 fath.	
[$\frac{1559-60}{10}$.	Off Sierra Leone, 1850 fath. (Challenger Exp.)		Exch. British Museum.
$\frac{3094}{10}$: $\frac{3665}{10}$.	Off coast S. Carolina, 353 fath.		Exch. Smithsonian Inst.]

Distribution: depths of the Atlantic, from Nova Scotia in the north-west to Tristan da Cunha in the south, from 250 to 2260 fathoms: depths of Indian Ocean, from 705 to 1997 fathoms: depths of the Pacific, from Yokohama in the north-west to Port Otway in Patagonia in the south-east, from (45 ?) 770 to 1875 fathoms.

2. Parapagurus minutus, Henderson. Plate X., fig. 3.

Parapagurus minutus, Henderson, J. A. S. B., Vol. LXV. 1896, pt. 2, p. 531: Alcock, Cat. Indian Deep Sea Crust., 1901, p. 222. Illustrations Zool. Investigator, Crust., pl. xxxii., fig. 3.

This small species, which inhabits shells of *Dentalium*, has the abdomen fully extended in a straight line. It differs from *P. pilosimanus* in the following characters:—

The rostral bulge is hardly perceptible, and the greatest breadth of the carapace is hardly two-thirds its length in the middle line.

The eyestalks are slightly more than half the length of the front border of the carapace, and reach to near the middle of the 2nd joint of the antennular and of the terminal joint of the antennal peduncles. The antennal acicle is strongly serrate along the inner margin.

The chelipeds are porcellanous and not remarkably tomentose. The right cheliped is nearly smooth, but usually the well-defined upper and lower borders of the palm and the corresponding borders of the fingers, and sometimes both borders of the wrist also, are (under a lens) granular or serrulate.

The 2nd and 3rd legs only slightly surpass the larger cheliped.

The length of the body is hardly 16 millim. (female with ova).

$\frac{8819}{9}$: $\frac{1082-88}{10}$. Between Maldives and C. Comorin, 719 fath. ... "Investigator."

In one specimen the *Dentalium* shell is encrusted and concealed by a colony of *Epizoanthus*.

3. PARAPAGURUS ANDERSONI, Henderson. Plate X., fig. 2.

Parapagurus andersoni, Henderson, J. A. S. B., Vol. LXV. 1896, pt. 2, p. 529 : Alcock, Cat. Indian Deep Sea Crust., 1901, p. 220. Illustrations Zool. Investigator, Crust., pl. xxxii., fig. 2.

Differs from *P. pilosimanus* in the following characters :—

The rostrum is more triangular and somewhat more prominent.

The tip of the ophthalmic scales is spinulose.

The antennular peduncle is about five-sevenths the length of the carapace, and its terminal joint is conspicuously club-shaped, not merely enlarged distally.

The antennal acicle is strongly serrated along the inner border.

The right cheliped of the male is about $3\frac{3}{4}$ times the length of the carapace ; it is setose but not thickly tomentose, the surface sculpture not being at all concealed, the cylindrical carpus is longer than the combined ischium and merus and considerably longer than the palm, and the dactylus is not two-thirds the length of the palm : the greatest breadth of the palm (distally) is not half its length : the outer surface of the merus, all surfaces of the carpus, and both borders of the palm (and the corresponding borders of the fingers) are thickly studded with acute granules or spinules.

The slender left cheliped of the male reaches to the distal third of the right carpus ; its joints are elongate, rather thickly setose, and almost smooth.

The 2nd and 3rd legs barely reach the end of the right cheliped; the anterior border of the merus, carpus and propodite is distantly but distinctly serrulate, and there are some spinules at the distal end of the posterior border of the merus of the 2nd pair.

Length of carapace, 12 millim.

$\frac{8817}{9}$.	Between Maldives and C. Comorin, 719 fath.	"Investigator."

3*a*. Parapagurus andersoni var. brevimanus, Henderson.

Henderson, *loc. cit.*: Alcock, *loc. cit.*

Differs from the type only in the form of the right cheliped, which is shorter in all its joints and especially in the palm.

In the right cheliped of the male the carpus is only as long as the combined merus and ischium, and only a little longer than the palm; the dactylus is as long as the palm, and the palm is as broad (distally) as long.

Consequently the left cheliped reaches beyond the middle of the palm of the right, and the 2nd and 3rd legs surpass the large cheliped.

Length of carapace 10½ millim.

$\frac{8820}{9}$.	Between Maldives and C. Comorin,	719 fath.	"Investigator."
$\frac{2394}{10}$.	" "	" 430 fath.	
$\frac{3745}{10}$.	" "	" 487 fath.	
$\frac{3746\text{-}47}{10}$.	Off C. Comorin,	595—556 fath.	
$\frac{3748}{10}$.	Off Travancore coast,	464 fath.	

Sympagurus, S. I. Smith.

Sympagurus, S. I. Smith, Proc. U. S. Nat. Mus. VI. (1883), 1884, p. 37: Henderson, Challenger Anomura, 1888, p. 52: Milne Edwards and Bouvier, Mem. Mus. Comp. Zool., Harvard, XIV. No. 3, 1893, p. 58; and Bull. Soc. Zool. France, XXII. 1897, p. 131; and Crust. Décap. Hirondelle et Princesse Alice, Monaco, 1899, pp. 55, 56: Stebbing, Hist. Crust., 1893, p. 166: Ortmann, in Bronn's Thier Reich, Malacostraca, p. 1145: Young, Stalk-eyed Crust. W. Indies, etc., 1900, p. 379: Alcock, Cat. Ind. Deep Sea Crust., p. 223.

This genus, as Milne Edwards and Bouvier have remarked (Mem. Mus. Comp. Zool., Harvard, *l. c.*), might be united with *Parapagurus*, from which it only differs in having the filaments of the gill-plumes either biserial, or quadriserial with the outer row on either side of the shaft rudimentary.

The species inhabit, not the abysses, but, for the most part, the moderate depths (150-750 fathoms) of the sublittoral slopes, and have, at those

depths, a very remarkable distribution, being found (1) off the West Indies and Atlantic coasts of the United States as far as 41° N., (2) in the Eastern Atlantic from the Azores and coast of Portugal to Cape Verde, and (3) in the Arabian Sea, Bay of Bengal, and Andaman Sea. Outside these areas only one species is at present known, and that from off the coast of New South Wales.

The Indian species are two in number, and both of them are merely varieties of Atlantic forms.

Key to the Indian species of the genus Sympagurus.

I. The upper border of the right palm is ornamented with two longitudinal sharply-serrated crests ... ... *S. bicristatus.*

II. The upper border of the right hand has a single serrated crest, inside which is a second non-cristiform row of serrations ... *S. arcuatus.*

1. Sympagurus arcuatus, Edw. and Bouvier.

Sympagurus arcuatus, Milne Edwards and Bouvier, Mem. Mus. Comp. Zool., Harvard, XIV., No. 3, 1893, p. 67, pl. v., fig. 21—28; and Bull. Soc. Zool. France, XXII. 1897, p. 133 (see also Crust. Decap. Hirondelle et Princesse Alice, Monaco, 1899, p. 56).

Distribution: West Indies, 138 to 229 fathoms.

Sympagurus arcuatus, E. & B. var. monstrosus, Alcock. Plate X., fig. 5.

? *Parapagurus monstrosus*, Alcock, Ann. Mag. Nat. Hist., March, 1894, p. 243.

Sympagurus monstrosus, Henderson, J. A. S. B., LXV., 1896, pt. 2, p. 533: Alcock, Cat. Ind. Deep Sea Crust., 1901, p. 223. Illustrations Zool. Investigator, Crust., pl. xxxii, fig. 4.

Differs from the description and figures of the West Indian form only in having the right hand more setose, and this to a variable extent.

Carapace strongly calcified only in the hepatic regions: rostrum though faintly carinated almost obsolete.

Eyestalks stout, dorsally setose, not much more than half the length of the anterior border of the carapace, reaching nearly to the end of the 2nd joint of the antennular peduncle and nearly to the end of the antennal peduncle. Eyes large, reniform: ophthalmic scales sharply acuminate.

Antennular peduncle more than two-thirds the length of the carapace, more than half its length being contributed by the terminal joint. The antennal acicle, which reaches to, or almost to, the end of the antennal peduncle, is sinuous and has its inner border serrated. Antennal flagellum nearly twice as long as the body.

The right cheliped, which is very massive, is from $2\frac{1}{3}$ to $2\frac{1}{2}$ times the length of the carapace and is setose, but not so thickly so as to in any way obscure the surface sculpture: the massive and sharply-trigonal carpus is longer than the combined ischium and merus and as long as, or longer than

the palm : the dactylus is as long as the palm, and the palm (which, like the fingers, is curved) is broader than long. The edges of the merus are serrate, especially the cristiform inner edge ; and the outer surface and edges—particularly the lower edge and the prominent inner edge—of the wrist are crisply granulous or spinulous. The lower edge of the palm and of the broad short fixed-finger, and the upper edge of the dactylus, are thin, almost cristiform, and very sharply serrated : the outer edge of the upper surface of the palm is defined by a thin sharply-serrated crest, and the inner edge of the same surface of the palm is much less distinctly defined by a row of less regular and less distinct serrations.

The slender left cheliped is setose and almost smooth, and hardly reaches to the base of the right dactylus.

The 2nd and 3rd legs of both sides reach well beyond the large cheliped, those of the right side being the longer : their joints are smooth, but there is a spinule at the far end of the anterior border of the carpus : sometimes the anterior border of the merus, carpus and propodite is distantly and very faintly serrulate : the dactyli are plumose distally, those of the 2nd pair being as long as their combined carpus and propodite, and those of the 3rd pair being longer.

Length of carapace 8 to 9 millim.

$\frac{8752}{9}$: $\frac{1028—77}{10}$.	Off Coromandel coast, 145—250 fath.	"Investigator."
$\frac{1115}{10}$.	Off Colombo, 142—400 fath.	
$\frac{2023—27}{10}$.	Off Travancore coast, 360 fath.	
$\frac{3750—51}{10}$.	Off Cape Comorin, 464 fath.	
$\frac{3895}{10}$.	Off Cape Comorin, 224—284 fath.	

2. SYMPAGURUS BICRISTATUS, A. M. Edw. and Bouv.

? Eupagurus bicristatus, Milne Edwards and Bouvier, Bull. Soc. Entom. Ital., XXIII., 1891, p. 240 ; and Mem. Mus. Comp. Zool. Harvard, XIV., No. 3, 1893, p. 154, pl. xi., fig. 11, 12.

Sympagurus bicristatus, Milne Edwards and Bouvier, Ann. Sci. Nat. Zool (7) XIII., 1892, p. 205 ; and Crust. Decap. Hirondelle, etc., Monaco, 1894, p. 69, pl. xi., fig. 1—15 ; and Monaco, 1899, p. 59 ; and Bull. Soc. Zool. France XXII., 1897, p. 133 ; and Crust. Decap. Travailleur et Talisman, pt. I. 1900, p. 196.

Distribution : Caribbean Sea, 508 fath.; W. Atlantic, from Azores and coast of Portugal to C. Verde, from about 55 fath. to about 883 fath.

SYMPAGURUS BICRISTATUS E. and B. var. INDICUS, Plate X., fig. 4.

Differs from typical specimens in the British Museum only in having the wrist and hand of the right cheliped a little longer and the hand a little less oval in shape, and the antennal acicle a little longer.

Differs from *S. arcuatus* var. *monstrosus* in the following characters :—

The eyestalks are not so broad and stout, nor nearly so setose : but they are dorsally more strongly calcified. The eyes are not so large, and not reniform.

In the right cheliped the carpus is much slenderer, and the upper surface of the palm is defined by *two* longitudinal sharply-serrated crests, both of which are equally well developed.

$\frac{1840}{10}$.	Andaman Sea, 405 fathoms.	"Investigator."
$\frac{4282-6}{10}$.	Indian Seas, depth and exact locality unknown.	

PAGURODES, Henderson.

Pagurodes, Henderson, Challenger Anomura, 1888, p. 94.

Pagurodes is allied to *Eupagurus*, *Catapagurus*, and *Nematopagurus*, but differs from them all in the particular character that the gill-plumes are quadriserial trichobranchiæ like those of *Parapagurus*. The only Indian species that I can now refer to this genus, namely, *Pagurodes limatulus* Henderson, agrees with *Nematopagurus* in the fact that the female only (not the male) has a pair of small appendages, modified for sexual purposes, on the first abdominal segment.

Carapace well calcified in front of the cervical region. Rostrum broad and obtuse. Abdomen well-developed, soft, spirally coiled.

Eyestalks short and stout : eyes of fair size, ophthalmic scales spiniform, distant. Antennular peduncles long, especially as to the terminal joint. Antennal acicle long, flagellum very long.

The external maxillipeds are widely separated at base. The exopodites of all three pairs of maxillipeds are flagellate. The palp of the 1st maxillæ is non-flagellate (has a rudiment of a flagellum in *P. limatulus*).

Chelipeds slender and unequal, the right considerably larger : the fingers move in a horizontal plane and the finger-tips are calcareous or slightly corneous.

The 4th pair of legs are subchelate and the 5th minutely chelate : in both the subterminal "rasp" of granules is present (though very narrow in the 4th pair) as it also is on both rami of the caudal appendages.

In the male the vas deferens protrudes as a very short curved tube from the coxa of the 5th right leg.

According to Henderson the males have 3 abdominal appendages, and the females 4, on the left side. [In one species, *P. limatulus*, the *females* have also a slender pair of appendages on the first abdominal segment.]

The gills are quadriserial trichobranchiæ and are 11 in number on either side, arranged as in *Parapagurus*, *Eupagurus*, *Catapagurus*, etc.

The species of this genus have been found only at considerable depths in the Indo-Pacific.

1. Pagurodes limatulus, Henderson. Plate XII., fig. 6.

Pagurodes limatulus, Henderson, Challenger Anomura, 1888, p. 96, pl. x., fig. 6: Alcock, Cat. Indian Deep-Sea Crust., 1901, p. 225.

Rostrum broadly triangular, obtuse, slightly more prominent than the obtuse antennal angles of the carapace.

Eyestalks stoutish, hardly half the length of the anterior border of the carapace dorsally sparsely setose, not reaching the middle of the penultimate joint of the antennal peduncle. Eyes not broader than the eyestalk. Ophthalmic scales small, distant, subacute.

The antennal peduncle, which is sparsely setose, reaches to about the middle of the terminal joint of the antennular peduncle ; the anterior angle of its 2nd joint forms a spine which reaches to the end of the eye. The acicle is curved, sparsely setose, and reaches nearly to the end of the peduncle. The slender flagellum is nude and much longer than the body.

The right cheliped is little longer, but much stouter, than the left, and is close upon three times as long as the carapace : the merus, which is about as long as the carpus, has some transverse setose rugæ on its upper aspect, its lower surface granulous, and a couple of spines at the far end of its lower border : the carpus, which is longer than the palm, has the upper surface granulous and sparsely setose, and the inner border spinulose, the spines increasing in size towards its distal end : the palm is much longer than broad and longer than the fingers, its upper surface is smooth, tending to be granulous towards the inner border : the fingers are more or less setose.

The left cheliped, which is very slender, reaches the middle of the right dactylus : the carpus is much longer than the palm and has two longitudinal rows of spinules on its upper surface, and a smooth rounded protuberance at the far end of its inner surface : the palm has the upper surface more or less granulous, with a median longitudinal ridge : the fingers are smooth and longer than the palm.

The 2nd and 3rd legs surpass the right cheliped by about one-fourth the length of their dactylus : the anterior surface of the merus and carpus and propodus is transversely rugulose and sparsely setose : the propodite, which ends in a yellow claw, is as long as the two preceding joints combined, and has numerous capillary spinelets on its posterior edge.

In the female there is a pair of small curved rod-like appendages on the first abdominal segment.

Length of carapace of male about 8 millim., a female is smaller

Colours in spirit, faint pinkish or very pale lilac.

$\frac{2391—93}{10}$.	Off Travancore coast, 430 fath.	"Investigator."

The "Challenger" type specimen, with which the "Investigator" specimens have been actually compared, came from south of the Philippines in 500 fathoms.

The damaged female specimen which in my Catalogue of Indian Deep-Sea Crustacea (p. 225) I referred with doubt to *Pagurodes inarmatus* Henderson, is, I find, on comparison with the "Challenger" types, not that species, although it has a strong resemblance to it. In fact, the "Investigator" specimen is not a *Pagurodes* at all, since its gills are not trichobranchiæ, but merely narrow phyllobranchiæ with the apex of each gill-plate expanded and bifid.

Nematopagurus, Edw. & Bouv.

Nematopagurus, Milne Edwards & Bouvier, Ann. Sci. Nat., Zool., (7) XIII. 1892, p. 209; and Crust. Decap. Hirondelle et Princesse Alice, Suppl., Monaco, 1899, p. 59; and Crust. Decap. Travailleur et Talisman, Pt. I, 1900, p. 200.

Carapace elongate, broadened posteriorly, well calcified in front of the cervical groove. Rostrum broad and indistinct. Abdomen well developed, soft, spirally coiled.

Eyestalks stout: ophthalmic scales small, distant. Antennal acicle long: flagellum long, nude or sparsely setose.

External maxillipeds widely separated at base: the exopodites of all three pairs of maxillipeds are flagellate. The endopodite (palp) of the 1st maxillæ is non-flagellate.*

The chelipeds, though nearly alike in form and sculpture and very little unequal in length, are unequal in bulk, the right being the larger: the fingers move in a horizontal plane and the finger-tips are corneous.

The 4th pair of legs are subcheliform and the 5th pair minutely cheliform: in both (as also on the uropods) there is the usual subterminal rasp of imbricating corneous granules.

In the male the vas deferens of the right side protrudes as a long tube ending in a long tapering filament, and that of the left side as a short conical tube or papilla.

* My material is so scanty that I have only ventured to *detach* the 1st maxillæ of one specimen, where find the flagellum of the palp to be represented by a minute papilla.

In the male, besides the uropods, there are three appendages (somites 3-5) on the left side. In the female, in addition to four (very unequally-biramous) appendages on the left side (somites 2-5), there is a pair of appendages, modified for sexual purposes, on the first abdominal somite. The uropods are more developed on the left side than on the right.

The gills, which are phyliobranchiæ, are 11 in number on either side, arranged as in *Parapagurus*, *Sympagurus*, and *Eupagurus*.

The affinities of this genus seem to be with *Eupagurus*, the principal point of difference being the presence in the female of *Nematopagurus* of a pair of appendages, modified for sexual purposes, on the 1st abdominal segment, as in *Pylopagurus*, *Pylopaguropsis* and *Munidopagurus*.

So far as is known at present the species of *Nematopagurus* are confined to the sublittoral depths of the Eastern Atlantic (between the coast of Spain and Cape Verde), of the Western Mediterranean, of the Arabian and Andaman Seas, and of the coast of Ceylon.

Key to the Indian species of the genus Nematopagurus.

I. Outer surface of the hand with a single median longitudinal row of spines:—
   1. Eyestalks shorter than the anterior border of the carapace — — ... ... *N. indicus.*
   2. Eyestalks as long as the anterior border of the carapace ... — — — *N. gardineri.*

II. Outer surface of the hand studded with numerous spines in addition to a conspicuous median longitudinal row — *N. muricatus.*

III. Outer surface of the hand (and wrist) covered with flat imbricating squamiform or scutiform tubercles: —
   1. Squames of the hand in several longitudinal series — *N. squamichelis.*
   2. Squames of the hand in two longitudinal series ... *N. scutellichelis.*

1. Nematopagurus indicus, n. sp. Plate XII., fig. 4.

This species hardly differs from *N. longicornis*, Edw. and Bouv., from the Western Mediterranean and adjacent Atlantic region. Except in the facts that the chelipeds are shorter and the antennal flagella less setose, the Indian species entirely conforms to the description and figures of the French authors.

Carapace with some regularly disposed tufts of hairs on the hepatic and gastric regions. Rostrum very broadly triangular, not so prominent as the antennal angles of the carapace, and leaving the ophthalmic segment exposed.

Eyestalks stout, much dilated anteriorly, not so long as the anterior border of the carapace, at least as long as the peduncles of the antennæ, and reaching beyond the middle of the terminal joint of those of the

antennules, dorsally sparsely setose. Eyes large. Ophthalmic scales widely separated, small, subacute with a subterminal spine on the under surface

Upper antennular flagellum more than two-thirds the length of the peduncle. Antennal acicle curved, setose, reaching end of peduncle: flagellum long, nude.

Chelipeds rather slender, similar in form and sculpture, of nearly equal length, but the right wrist and hand broader and bulkier than the left: like the legs they are copiously setose, but not so densely as to obscure the surface sculpture: their length is about twice that of the carapace. The carpus is about as long as the merus, and much longer than the palm; the palm is longer than broad, and longer than the fingers in the case of the right hand, but shorter in the case of the left: the inner border of the carpus and palm is spinose, the outer surface of the carpus and palm is traversed by a longitudinal spinose carina—submedian in the case of the carpus, median in the case of the palm, the outer border of the palm and fixed finger is serrated: the finger-tips are conspicuously corneous.

The 2nd and 3rd pairs of legs surpass the chelipeds by about half the length of their dactyli: there is a spine at the far end of the anterior border of the carpus, and there are numerous capillary spinelets in the distal half of the posterior border of the dactylus, which latter joint is stout, compressed, curved, and ends in a dark-coloured claw: the dactylus of the 3rd pair, which is a little longer than that of the 2nd, is nearly as long as the two preceding joints combined.

The right vas deferens is a stout tube ending in a very long lax curly filament; the left is short and blunt. The first pair of abdominal appendages of the female are short curved rods.

Length of carapace 10 millim.

Inhabiting shells of *Pirula*, *Astralium*, and *Tritonidea*.

$\frac{4732—4}{10}$. Off Travancore coast, 102 fathoms. "Investigator."

2. NEMATOPAGURUS GARDINERI, n. sp. Plate XII., fig. 2.

Resembles *N. indicus*, but has much longer eyestalks and more pilose chelipeds.

Carapace smooth, rostrum indistinct. Eyestalks as long as the anterior border of the carapace, longer than the antennal peduncles, and reaching to the distal fourth of the terminal joint of the antennular peduncles:

eyes not much expanded: ophthalmic scales very small, bifid at tip. Antennal acicle curved, setose, nearly reaching the end of the peduncle: flagellum long, nude.

Chelipeds thickly pilose, especially so on the outer surface of the wrist and palm; the right is a little larger than the left, but both are almost alike in form and sculpture: the carpus has an iridescent sheen, its inner edge is spinose, and there is a median longitudinal row of spines on its outer surface: both edges of the palm are well defined and serrulate, and there is a median longitudinal carina on the outer surface of the palm: the palm is slightly longer than broad, longer than the fingers in the right cheliped, and about as long as the fingers in the left.

2nd and 3rd legs nearly a dactylus longer than the chelipeds: they are sparsely setose and except for a spine at the far end of the anterior border of the carpus are unarmed: the dactyli end in a sharp claw and have some capillary spinelets on their posterior border: the dactylus of the 3rd pair is about as long as the combined merus and carpus.

The paired appendages of the first abdominal somite of the female are slender curved rods.

Length of carapace of an egg-laden female 5 millim.

A single specimen, inhabiting a shell of a Cerithiid, from the Maldive Is.

From Mr. Stanley Gardiner's Maldive collection: not in the Museum.

3. Nematopagurus muricatus, Henderson. Plate XII., fig. 5.

Catapagurus muricatus, Henderson, J. A. S. B., LXV., 1896, pt. 2, p. 524. Illustrations Zool. Investigator, Crust., pl. XXXI., fig. 3.

Carapace nude; rostrum broad, rounded, obsolescent, not so prominent as the antennal angles of the carapace.

Eyestalks stout, much dilated anteriorly, not so long as the front border of the carapace, about as long as the antennal peduncles, and reaching to the middle of the terminal joint of the peduncles of the antennules. Eyes large. Ophthalmic scales widely separated, small, subacute with a subterminal spinule on the under surface.

Upper antennular flagellum longer than the terminal joint of its peduncle. Antennal acicle curved and reaching nearly to the end of the eye.

Chelipeds subequal and similar, the right hand and wrist a little bulkier than the left, like the legs sparsely setose: the carpus is much longer than the merus and longer than the palm, the palm is longer than broad, the fingers of the right cheliped are shorter than, and those of the left cheliped are

about equal to, the palm: the carpus has the inner edge spinose, and has a median longitudinal row of granules or blunt spinules on its outer surface: both edges of the palm (and the corresponding edges of the fingers) are spinose, and the outer surface of the palm is studded with blunt, curved spines, one series of which forms a close-set median longitudinal row extending to the tip of the fixed finger: the finger-tips are corneous.

The 2nd and 3rd pairs of legs surpass the chelipeds; the anterior border of the carpus and propodite is distantly serrulate; the dactylus is about as long as the two preceding joints combined.

The right vas deferens is long, and ends in a long lax curling filament, the left is short and papilliform.

The paired appendages of the first segment of the female abdomen are slender, curved rods, closely embracing the thoracic sternum.

Length of carapace of male about 7 millim., a female with eggs is smaller.

One specimen inhabits a shell that is embedded and hidden in a large colony of *Epizoanthus*.

$\frac{1119}{10}$.	Off north-east coast of Ceylon, 28 fath	"Investigator."
$\frac{4735—6}{10}$.	Off south coast of Ceylon, 34 fath.	

4. Nematopagurus scutellichelis, n. sp. Plate XII., fig. 3.

Gastric region nude. Rostrum broad, rounded, obsolescent, not so prominent as the antennal angles of the carapace, and leaving the ophthalmic segment exposed.

Eyestalks piriform, not so long as the front border of the carapace, reaching a little beyond the middle of the terminal joint of the antennal peduncle. Eyes reniform. Ophthalmic scales distant, small, papilliform, with a tiny subterminal spinule inferiorly.

Upper antennular flagellum about as long as the terminal joint of its peduncle. The antennal peduncle is shorter than that of the antennules: acicle curved, not reaching the end of the eye: flagellum long, nude.

Chelipeds subequal and similar, but the right wrist and hand are more massive than the left; they are a little more than twice the length of the carapace and, like the legs, are almost nude on the extensor surface: the carpus is as long as the merus and longer than the palm, the palm is longer than broad, and the fingers of the right hand are a little shorter than, while those of the left are about the same length as, the palm: the merus has 1 or 2

spinules at the far end of its lower borders: the entire outer surface of the carpus and hand is covered with large, flat, imbricating, regularly-arranged, scute-like tubercles, the free edge of which is inconspicuously ciliated: on the palm these scutes form two series only: the inner edge of the carpus is spinose, but the edges of the palm and fingers are entire: the finger-tips are inconspicuously corneous.

The 2nd and 3rd legs exceed the chelipeds by about half their dactylus: the outer surface of the merus and carpus is squamose, that of the propodite is ringed or scutellated, the squames and scutes being nude and polished: the anterior borders of the carpus of both pair, and the posterior border of the merus of the 2nd pair are spinulose: the dactylus is long, curved, slender, and perfectly nude, that of the 3rd pair, which is a little longer than that of the 2nd, is equal to the two preceding joints combined.

The right vas deferens is a long tube ending in a long lax curling filament, the left is also of good length.

Colours in spirit: ivory-white with some faint orange spots on the legs.

Length of carapace about 8 millim.

The shell is a species of *Murex*.

$\frac{4298}{10}$. Between the Maldives and C. Comorin, 824 fath. "Investigator."

5. Nematopagurus squamichelis, n. sp. Plate XII., fig. 1.

Gastric region nude except for a couple of long setæ on the rostrum. Rostrum broad, rounded, obsolescent, but more prominent than the blunt antennal angles of the carapace, leaving the ophthalmic segment exposed.

Eyestalks depressed, very broadly piriform, about two-thirds the length of the anterior border of the carapace, considerably shorter than the antennal peduncle. Eyes very large, reniform. Ophthalmic scales distant, very small, bluntly bifid at tip.

The peduncle of the antenna is quite, or nearly, as long as that of the antennule: antennal acicle curved, sparsely setose, reaching the middle of the terminal joint of the peduncle: flagellum very long, almost nude.

Chelipeds subequal and similar, but the right is more massive in wrist and hand than the left: they are about twice the length of the carapace, and, like the legs, are very hairy: the carpus is as long as the merus and longer than the palm, the palm is longer than broad, and the fingers of the right hand are a little shorter, while those of the left are a little longer, than the palm: the merus has 1 or 2 spinules on its lower borders: the outer surface of the carpus and hand is closely covered with flat, squamiform, imbricating tubercles,

the free edges of which are elegantly ciliated, the scales on the hand forming several series : the inner edge of the carpus, both edges of the palm, and the outer edge of the fixed finger are spinose : the finger-tips are markedly corneous.

The 2nd and 3rd legs exceed the chelipeds by about half their dactylus : the anterior and upper surfaces of the long joints are covered with transverse ciliated and pilose subsquamiform markings : there is a spine at the far end of the anterior border of the carpus : the dactylus is stout and curved, that of the 3rd pair is as long as the two preceding joints combined.

The paired appendages of the first abdominal somite of the female are L-shaped rods.

Colours in spirit : ivory-white.

Length of carapace 14 millim.

$\frac{2213\text{-}4}{10}$. Andaman Sea, 185 fathoms. "Investigator."

Catapagurus, A. M. Edw.

Catapagurus, A. Milne Edwards, Bull. Mus. Comp. Zool. Harvard, VIII. 1880, p. 46; S. I. Smith, Bull. Mus. Comp. Zool. Harvard, X. 1882, p. 14 : Henderson, Challenger Anomura, 1888, p. 75 : Milne Edwards & Bouvier, Mem. Mus. Comp. Zool. Harvard, XIV. No. 3, 1893, p. 125 : T. R. R. Stebbing, Hist. Crust. 1893, p. 165 : Young, Stalk-eyed Crust., W. Indies, etc., p. 374.

Hemipagurus, S. I. Smith, Ann. Mag. Nat. Hist. (5) VII. 1881, p. 143; and Proc. U. S. Nat. Mus. III. 1881, p. 422.

Carapace short, broad, well calcified in front of the cervical suture : rostrum obtuse, leaving the ophthalmic segment exposed. Abdomen well developed, soft, spirally coiled.

Eyestalks short and stout : eyes large : ophthalmic scales distant. Antennal acicle of moderate length : flagellum very long and slender, naked or sparsely setose.

External maxillipeds widely separated at base : the exopodites of all three pairs of maxillipeds are flagellate.

The chelipeds may be of about equal length, but the right is stouter than the left, especially in the male : the fingers move in a horizontal plane, and the finger-tips are calcareous.

The 3rd pair of legs are not, or hardly, subcheliform and have the subterminal "rasp" narrow : the 5th pair are minutely subcheliform and have the usual subterminal "rasp."

The right vas deferens protrudes as a long, more or less rigid tube, which is recurved upwards over the right flank and then on to or across the dorsum of the abdomen from right to left: it does not end in a filament.

The abdominal appendages are placed on the left side and are usually four in number (somites 2-5) in both sexes, the first three in the female being biramous. The uropods are more developed on the left side than on the right and the telson is emarginate or bifid.

The gills are 11 in number on either side, arranged as in *Parapagurus*, *Sympagurus*, *Eupagurus*, *Spiropagurus*, and *Anapagurus*.

Catapagurus differs from *Spiropagurus* and *Anapagurus* in the fact that it is the *right* vas deferens, not the left, which is produced into a tube; it further differs from *Spiropagurus* in the greater inequality of the chelipeds. It differs from *Cestopagurus* in the form and direction of the protruded vas deferens, which in the last-named genus curves from right to left *beneath*, not above, the abdomen, and may end in a filament as in *Nematopagurus*. In *Catapaguroides* the left vas deferens protrudes, as well as the right, as it does also in *Nematopagurus*.

The species of *Catapagurus* are for the most part sublittoral, and, except that they have not been found in the eastern part of the Atlantic, have much the same geographical range as those of *Spiropagurus*. They occur in the western part of the North Atlantic, from the West Indies to Massachusetts, at depths of about 50 to about 250 fathoms, in Oriental seas from the Maldives to Japan, and again off the Panama coast of the Pacific.

Henderson's *Catapagurus muricatus* from Ceylon is a *Nematopagurus*, as the female is provided with a pair of appendages on the first abdominal somite.

1. Catapagurus ensifer, Henderson. Plate XIII., fig. 3.

Catapagurus ensifer, J. R. Henderson, Trans. Linn. Soc., Zool., (2) V. 1893, p. 424, pl. xxxviii, fig. 16-19.

Carapace glabrous; rostrum obtuse, barely as prominent as the well-defined antennal angles of the carapace.

Eyestalks broad, much shorter than the front border of the carapace reaching to about the middle of the 2nd joint of the antennular peduncle and to the end of the penultimate joint of the antennal peduncle. Eyes large, somewhat pale. Ophthalmic scales spiniform, distant.

Antennal peduncle much shorter than that of the antennules. Acicle short, hardly reaching to the end of the penultimate joint of the peduncle: flagellum more than twice the length of the body, nude.

Except for a few long setæ on the fingers and edges of the palm, the chelipeds are quite glabrous: they are of about the same length and are of slender make, but the right is stouter than the left, especially in the male, in which sex they are more than thrice as long as the carapace. The carpus is about as long as the merus and longer than the palm, and its upper surface is closely and very finely granulous. The palm is longer than broad (very much longer in the case of the left hand) and longer than the fingers in the right hand and about the same length as the fingers in the left.

The 2nd and 3rd legs slightly surpass the chelipeds. Except for a few setæ and for one or two spinules at the far end of the anterior border of the merus, they are smooth and glabrous. The propodus and dactylus are flattened, elongate, and of about equal length, the dactylus being broader than the propodus, extremely thin, and shaped like the blade of an Indian sword.

The right vas deferens is recurved upwards over the right flank and then over the dorsum of the abdomen as far as the base of the left leg.

Length of carapace of male about 4·5 millim., a female with eggs is smaller.

The animal inhabits light broad-mouthed shells which in some cases are covered by a single sea-anemone.

$\frac{4746}{10}$. Maldive Islands. J. Stanley Gardiner.

Henderson's specimens came from the Gulf of Martaban.

Cestopagurus, Bouvier.

Cestopagurus, Bouvier, Bull. Mus. d'Hist. Nat. Paris, 1897, p. 229.

Differs from *Catapagurus* in the following particulars:—

The rostrum is more prominent: the eyestalks are long and not remarkably stout, and the eyes are of moderate size. The long, curved, tubular vas deferens passes from the coxa of the 5th right leg, across the *ventral* surface of the abdomen, and then ascends over the *left* flank.

This genus is known, so far, only from the G. of Aden and the Maldives.

1. Cestopagurus olfaciens, n. sp.

Rostrum fairly prominent. Eyestalks longer than the front border of the carapace, and than the antennal peduncles, but much shorter than the antennular peduncles. The antennular peduncles are particularly long and stout, their terminal joint is club-shaped, and their upper flagellum is divided

into about 9 segments (not including the terminal filament), each of which carries a tuft of olfactory hairs that is longer and more conspicuous than the lower flagellum.

The right cheliped is very much larger than the left, and is smooth and almost bare: the hand is the longest joint, and the palm is longer than broad, and broader at its far end than at its near end: the fingers meet throughout their extent.

Legs smooth and bare, the dactyli long and very slender. In the male the right vas deferens is a rigid curved tube, which passes from the coxa of the 5th right leg across the ventral surface of the abdomen and then ascends obliquely over the left flank, slightly increasing in size distally and ending abruptly.

Length of carapace of a male about 3 millim., of an egg-laden female 2 millim.

In two male specimens the left gill-chamber is greatly distended by a parasite.

From Mr. Stanley Gardiner's Maldive Islands collection.

Spiropagurus, Stimpson.

Spiropagurus, Stimpson, Proc. Acad. Nat. Sci. Philad. (1858) 1859, p. 236; Henderson, Challenger Anomura, 1888, p. 71; Milne Edwards and Bouvier, Mem. Mus. Comp. Zool. Harvard, XIV., No. 3, 1893, p. 110; T. R. R. Stebbing, Hist. Crust., 1893, p. 165; Ortmann, in Bronn's Thier Reich, Malacostraca, p. 1145; Young, Stalk-eyed Crust. W. Indies, 1900, p. 372.

Carapace depressed, broadened posteriorly, well calcified in front of the cervical groove and in the vicinity of the cardiac region. Rostrum broad, obsolescent, leaving the ophthalmic somite exposed. Abdomen well developed, soft, spirally coiled.

Eyestalks short, distally broadened: eyes large; ophthalmic scales distant. Antennal acicle long: flagellum very long, nude, or sparsely setose.

The external maxillipeds are widely separated at base: the exopodites of all three pairs of maxillipeds are flagellate. The endopodite (palp) of the 1st maxillæ is non-flagellate.

The chelipeds are equal or subequal and similar, or the right may be the larger: the fingers move in a horizontal plane and the finger-tips are calcareous.

The 4th pair of legs are scarcely subcheliform, and have the rasp of imbricating granules on the propodite much reduced in breadth. The 5th pair are cheliform and (like the caudal swimmerets) have the usual subterminal rasp of imbricating corneous granules.

The left vas deferens protrudes as a long rigidly-coiled blunt-tipped tube, the coil taking about two complete turns in the Indian species. The right vas deferens does not protrude.

The abdominal appendages are placed on the left side and are three in number in the male and four in number (the first three biramous and large) in the female. The telson is deeply bifid and spinose.

The gills are phyllobranchiæ and are 11 in number on either side, arranged as in *Parapagurus*, *Sympagurus*, *Eupagurus* and *Nematopagurus*. In the West Indian species, according to Milne Edwards and Bouvier, the gill-plates are bifid at tip, but this is not the case in the East Indian species.

This genus appears to me to be most closely related to *Eupagurus*.

The species of *Spiropagurus* have a sublittoral tendency and, like so many other elements of the Oriental sublittoral fauna, a circumtropical distribution at definite points: four species belong to the Panama-Pacific and West Indian region, one occurs in the Eastern Atlantic from the Canaries to Senegambia, and one (with varieties) is found in Oriental seas from the Maldives to China and Japan.

The North-eastern Atlantic species that were referred to this genus by Sars are now considered to belong to *Anapagurus*.

Key to the Indian species and varieties of the genus Spiropagurus.

A. Eyestalks dorsally with transverse ciliated lines, one of which forms a fringe to the base of the eye: antennal acicle irregularly setose ... ... *S. spiriger.*

B. Eyestalks dorsally smooth and nude; antennal acicle long-plumose:—

1. Two longitudinal rows of spines on carpus of chelipeds *S. spiriger* var. *profundorum.*
2. Three longitudinal rows of spines on carpus of chelipeds and 2nd and 3rd legs ... *S. spiriger* var. *spinosicarpis.*
3. Upper edge of merus of chelipeds carinate: upper surface of merus of 2nd and 3rd legs very sharply carinate, longitudinally, near the anterior border. *S. spiriger* var. *lophomeris.*

1. Spiropagurus spiriger, DeHaan. Plate XIII., fig. 1.

Pagurus spiriger, De Haan, Faun. Japon. Crust., 1849, p. 206, pl. xlix, fig. 2

Spiropagurus spiriger, De Haan, Stimpson, Proc. Acad. Nat. Sci. Philad. (1858) 1859, p. 248: Henderson, Challenger Anomura, 1888, p. 72; and Trans. Linn. Soc., Zool. (2), V., 1893, p. 425, and J. A. S. B., LXV. pt. 2, 1896, p. 524: Ortmann, Zool. Jahrb. Syst., VI., 1891-92, p. 297: Lanchester, P. Z. S, 1902, II., p. 364.

Carapace depressed, tomentose, the branchial regions more or less studded with small, transverse, squamiform markings (but sometimes quite smooth).

Rostrum broadly triangular, hardly as prominent as the broad antennal angles of the carapace.

Eyestalks piriform, dorsally beset with transverse ciliated lines, not two-thirds the length of the anterior border of the carapace, much shorter than the antennal peduncles. Eyes large, reniform : ophthalmic scales thin, foliaceous, dorsally concave, fringed with setæ, distant.

The antennal and antennular peduncles are of nearly equal length, the former are stout and their dorsal surface has a squamose appearance : antennal acicle curved, surpassing the eye, setose but not plumose : flagellum very long, nude.

Chelipeds and legs ciliated and tomentose, the edges of the legs plumose as if for swimming.

The chelipeds, which are subequal and not twice the length of the carapace, are decidedly slender, none of their joints being so stout as the meropodites of the 2nd and 3rd legs : they are covered with squamiform ciliated markings, and their only armature consists of a row of spines in the distal half of the inner border of the wrist, and another shorter longitudinal row of spines in the distal part of the outer surface of the wrist : the wrist is shorter than the merus and a little longer than the palm : the palm is much longer than broad and a little shorter than the fingers.

The 2nd and 3rd legs surpass the chelipeds by almost the whole length of their dactylus : the merus and carpus and propodite are broad, stout and compressed, as if for swimming, and they are covered with ciliated squamiform markings which on the propodite and posterior part of the carpus run very obliquely : a thin, fine, smooth crest separates the upper from the outer surface of the propodite : the dactyli are narrow, curved and compressed, those of the 3rd pair, which are the longest, being as long as the two preceding joints combined : except for a row of spines on the anterior border of the carpus, and sometimes also on the anterior border of the propodite, the legs are not spinose.

The vas deferens (left) is of relatively enormous size and forms a rigid coil of two nearly complete turns.

Length of carapace 16 millim.

$\frac{3156}{5}$; $\frac{7911}{9}$.	Sandheads, R. Hooghly.	Messrs. Barnett & Milner.
$\frac{394\text{-}7}{7}$.	Orissa coast, 25 fath.	"Investigator."
$\frac{413\text{-}6}{7}$; $\frac{3486}{7}$.	Orissa coast, 23 fath.	
$\frac{2943}{7}$.	Ganjam coast, 28-30 fath.	
$\frac{1091\text{-}2}{10}$.	Off. N. E. coast Ceylon, 28 fath.	
$\frac{4737\text{-}45}{10}$.	Madras.	Purchased.

Distribution: Japanese and Chinese Seas to 16 fathoms: Seas of E. Indian Archipelago from 18 to 49 fathoms: Bay of Bengal to 30 fathoms: Maldive Is.

1*a*. SPIROPAGURUS SPIRIGER var. PROFUNDORUM, nov. Plate XIII., fig. 5.

The only points at which this variety diverges are the following:—

(1) The eyestalks are nude and smooth; (2) the antennal peduncle has no squamose markings: (3) the antennal acicle is fringed on both edges with very long and regular setæ: (4) the two longitudinal rows of spines on the upper surface of the wrist of the chelipeds extend along the whole length of the joint; (5) the posterior border of the meropodites of the 2nd and 3rd legs is strongly spinose.

In all other respects it entirely resembles the typical form.

$\frac{8954}{6}$.	Andaman Sea, 35 fath.	"Investigator."
$\frac{4299}{10}$.	Between Maldives and C. Comorin, 824 fath.	

1*b*. SPIROPAGURUS SPIRIGER var. LOPHOMERIS, nov. Plate XIII., fig. 7.

As in var. *profundorum* the eyestalks are nude and smooth, the surface of the antennal peduncle is smooth, and the antennal acicle is fringed with long setæ. The spines on the wrists of the chelipeds are fewer: the posterior border of the merus of the 3rd pair of legs is spinulose in its distal half.

The merus of the chelipeds has the upper border carinate, and in the merus of the 2nd and 3rd legs the posterior surface is remarkably flattened and is demarcated from the upper surface by a thin fine smooth carina.

In all other particulars it entirely resembles the typical form.

$\frac{9024}{6}$.	Andamans, 20 fathoms	"Investigator."

1*c*. SPIROPAGURUS SPIRIGER var. SPINOSICARPIS, nov. Plate XIII., fig. 6.

As in varr. *profundorum* and *lophomeris* the eyestalks are nude and smooth, the surface of the antennal peduncle is smooth, and the antennal acicle is fringed with long setæ.

The chelipeds of the male (but not of the female) are distinctly stouter than the legs. On the upper surface of the carpus of the chelipeds and 2nd and 3rd legs there are three longitudinal rows of spines: there are also some spines on the posterior border of the merus of the 3rd pair of legs.

In all other respects it entirely resembles the typical form.

$\frac{4321}{10}$.	Madras coast ?	Asiatic Society of Bengal. (3)
$\frac{4342}{10}$	Andamans.	J. Wood-Mason. (2)

Anapagurus, Henderson.

Anapagurus, Henderson, Trans. Nat. Hist. Soc. Glasgow, 1886, p. 27: Proc. Roy. Phys. Soc. Edinb., IX., 1885-88, p. 73: Challenger Anomura, 1888, p 73: Milne Edwards and Bouvier, Mem. Mus. Comp. Zool., Harvard, XIV., No. 3, 1893, p. 119; and Crust. Decap. Hirondelle, Monaco, 1894, p. 71: T. R. R. Stebbing, Hist. Crust. 1893, p. 165: Ortmann, in Bronn's Thier Reich, Malacostraca, p. 1145: Young, Stalk-eyed Crust. W. Indies, 1900, p. 373.

According to Milne Edwards and Bouvier *Anapagurus* differs from *Spiropagurus* in the following characters :—

The chelipeds are very unequal, the right being the larger (the disparity, in adult males, being, according to Henderson, often very striking).

The flagellum of the 1st maxillipeds appears to be not articulated.

The gill-plates are broad, and not, or hardly, bifid at tip (but this is also the case in *Spiropagurus spiriger*).

The left vas deferens is simply curved, not coiled.

The 4th and 5th thoracic legs are generally subcheliform.

Henderson emphasizes the following differences :—

The right cheliped is much larger than the left: the 2nd and 3rd thoracic legs are long and slender: the left vas deferens is a short, curved, membranous organ.

The members of this genus are for the most part sublittoral, and appear to find their optimum on the European and African side of the North Atlantic from Norway to Cape Verde. Two species are found in the West Indian region, down to 229 fathoms; two of the Eastern North Atlantic species extend into the Western Mediterranean; one species—a variety of the Eastern Atlantic *A. pusillus*—occurs in Japan; one species has been reported from the New South Wales littoral; and finally, a damaged specimen that, I think, can only be referred to this genus, occurs in Mr. Stanley Gardiner's Maldive Islands collection.

1. Anapagurus sp.

The single specimen has a carapace not quite 4 millim. long, and has lost all its large appendages, except one ambulatory leg. The left vas deferens is a stout, soft, simply-curved tube of considerable length. The single

remaining ambulatory leg is long and slender; its merus, carpus, and propodite are not broad compressed organs for swimming as they are in *Spiropagurus spiriger*.

From Mr. Stanley Gardiner's Maldive collection: not in the Museum.

Eupagurus, Brandt.

Eupagurus, Brandt, in Middendorff's Reise in Sibiriens, Zool., II., i. 1851, p. 105: Stimpson, Proc. Acad. Nat. Sci. Philad. (1858) 1859, p. 236: Heller, Crust. südl. Europ., 1863, p. 158; Miers, Cat. Crust. N. Zealand, 1876, p. 62: Haswell, Cat. Austral. Crust., 1882, p. 152: Henderson Proc. Roy. Phys. Soc. Edinb., IX., 1885-88, p. 68; and Challenger Anomura, 1888, p. 62: Ortmann, Zool. Jahrb., Syst., VI., 1891-92, p. 297; and in Bronn's Thier-Reich, Malacostraca, p. 1145: Benedict, Proc. U. S. Nat. Mus., XV., 1892, p. 1: Milne Edwards and Bouvier, Mem. Mus. Comp. Zool. Harvard, XIV., No. 3, 1893, p. 139; and in Crust. Decap. "Hirondelle," Monaco, 1894, p. 73: T. R. R. Stebbing, Hist. Crust., 1893, p. 160; and P. Z. S., 1900, p. 534: Thomson, Trans. N. Z. Inst., 1898, p. 172.

Bernhardus, Dana, U. S. Expl. Exp. Crust., pt. I., 1852, p. 440.

Carapace elongate, broadened posteriorly, well calcified in front of the cervical groove: rostrum either distinct or obsolescent. Abdomen well developed, soft, spirally coiled.

Eyestalks either stout or slender, ophthalmic scales usually distant. Antennal acicle long; flagellum long, nude or more or less setose.

External maxillipeds widely separated at base: the exopodites of all three pairs of maxillipeds are flagellate. The endopodite (palp) of the 1st maxillæ is without a flagellum, but may sometimes have a rudiment of one.

The chelipeds are usually dissimilar and unequal, the right being much the larger; very rarely are they subequal: the fingers move in a more or less horizontal plane, and the finger-tips are calcareous, rarely corneous.

The 4th pair of legs are subcheliform; the 5th pair are minutely or imperfectly cheliform, the fingers being very short and blunt: in both pairs (as also on the uropods) the usual subterminal pavement of imbricating granules is found.

The abdominal appendages, in addition to those that form the tail-fan, are four in number (somites 2—5) in both sexes: they are unequally biramous, one ramus in the case of the 4th appendage being a minute rudiment, and are placed as usual on the left side. In some cases, in the male, the appendage of somite 2 is absent. The telson and uropods are usually better developed on the left side than on the right.

The gills are phyllobranchiæ (occasionally having the gill-plates cleft at tip) and are 11 on either side, arranged as in *Parapagurus* and *Sympagurus*.

Eupagurus is by far the largest of all the genera of *Paguridæ* and includes nearly 150 species, of which about 38 per cent. are sublittoral, though none seem to go to depths below 850 fathoms. Though the genus is represented in almost all the seas of the world—with certain notable exceptions to be presently specified—it reaches its optimum, as regards both the number of species and the size of individuals, in the cold sub-arctic waters of the northern hemisphere. Its lines of distribution, starting from the local point, may thus be followed :

From the Persian Gulf (2 sp. in 40—49 fath.) we find representatives along the Malabar sublittoral (4 sp. in 10—824 fath.), at the Maldives (1 sp.) and Ceylon (3 sp. in 26—28 fath.) and all along the west side of the Bay of Bengal (1 common sp. in 15—26 fath.) as far as Orissa. Next we find the genus in the Andaman Sea (2 sp. in 20 fath.) and scattered through the Malay Archipelago (3 sp. down to 36 fath.) and along the east coast of Australia as far as Bass Str. (6 sp. down to 52 fath.). In the South Pacific we note 14 species (shore to 700 fath.) from the coasts of New Zealand (one of the New Zealand species turning up again at the Falkland Is.), and three outlying species at Fiji, Samoa and Tahiti.

In the western North-Pacific littoral the species increase in number from the Philippines and China Sea (2 or 4 sp. down to 115 fath.) to the seas of Japan, where, between the shore and 150 fathoms, 20 or more species are known. In the Behring Sea and the sub-arctic region between Kamtschatka and Alaska the species are extremely numerous, especially inside the hundred-fathom line, and they continue so all along the Pacific coast of North America as far as Mexico. Two outlying species occur at the Cocos and Galapagos Islands, and a few species are scattered along the shores of Peru and Chili and the western coast of Patagonia as far as C. Horn. The genus is sparsely represented all along the Atlantic coast of S. America from the Falklands and Patagonia to the Caribbean, but in the Gulf of Mexico and the neighbourhood of Florida the species again become fairly numerous, and several species are common along the Atlantic coast of N. America as far as Newfoundland. The genus is characteristic of Arctic and sub-arctic seas from Greenland to Scandinavia, and is abundantly represented, from the shore to about 800 fathoms, in the eastern North Atlantic, from the Shetlands to Cape Verde, several species extending also into the Mediterranean.

At Senegal the genus *Eupagurus* seems to stop, for with the exception of a single species dredged by the " Challenger " off Tristan d' Acunha, no *true Eupagurus* (species supposed at first to be *Eupagurus* have since, by common consent, been referred to other genera) has been reported from the eastern side of the South Atlantic. Indeed, I can find no record of any true species of *Eupagurus* from any part of Africa, except the Mediterranean coast and the north-west coast from Morocco to Senegal.

It would seem as if, at some time prior to the establishment of the present *littoral* fauna of southern and eastern Africa (whose affinities are unquestionably "Indo-Pacific"), certain land-barriers had extended (1) diagonally across the Atlantic from somewhere near the Falkland Islands to somewhere near Cape Verde, and (2) diagonally across the Indian Ocean from the extreme southern limit of Africa to the peninsula of India, and had prevented this almost cosmopolitan genus *Eupagurus* from getting access to any part of the African continent, except those coasts which are washed by the North Atlantic. Of course I am aware that, on other grounds, this is no novel theory; also that the past existence of the trans-oceanic barriers here alluded to—at any rate of the one across the Indian Ocean—is supported by other evidence, and also that by many good authorities such trans-oceanic connexions are regarded as preposterous nonsense. All that I wish to do here is to emphasize my opinion that the geographical distribution of *Eupagurus*, like that of other sub-littoral, or mainly sub-littoral, genera of *Paguridæ*—the question of the *littoral* fauna is quite distinct—is consonant with the theory.

Key to the Indian species of the genus Eupagurus.

I. Eyestalks as long as or longer than the anterior border of the carapace :—

  A. Rostrum obsolescent : the upper border of the right palm overhangs the base of the dactylus as a lobe ... ... *E. pergranulatus.*

  B. Rostrum acute, projecting between the ophthalmic scales : the upper border of the right palm does not overhang the dactylus :—

    i. Palm of left cheliped longer than fingers : left cheliped and 2nd and 3rd legs longitudinally striped in red throughout their length ... ... *E. zebra.*

    ii. Fingers of left cheliped longer than palm : only the meropodites of the chelipeds and legs are longitudinally striped ... *E. investigatoris.*

II. Eyestalks distinctly shorter than the anterior border of the carapace :—

  A. Rostrum not so prominent as the antennal angles of the carapace : right cheliped straight and rather slender : peduncles of antennules longer than those of antennæ :—

    i. Chelipeds densely tomentose, the wrists and hands being buried in a shaggy covering ... ... *E. Macardlei.*

    ii. Chelipeds with a short patchy tomentum, not concealing the surface sculpture : a

pinhole foramen in the under surface of the carpus of one or both chelipeds :—

a. Entire outer surface of carpus of right cheliped spinose ... *E. nephromma.*

b. A longitudinal groove on the upper surface of the carpus of the right cheliped is always free of spines — — *E. carpoforaminatus.*

B. Rostrum acute, projecting between the bases of the ophthalmic scales : right cheliped enormously massive and having the wrist and hand permanently deflexed : peduncles of antennæ as long as those of the antennules — — *E. janitor.*

III. Eyestalks not half the length of the anterior border of the carapace, swollen at base but distally compressed ... *Eupagurus sp.*

1. Eupagurus pergranulatus, Henderson. Plate XI., fig. 1.

Eupagurus pergranulatus, Henderson, J. A. S. B., LXV., 1896, pt. 2, p. 520. Ill. Zool. Investigator, Crust., pl. xxxi., fig. 1.

Rostrum and antennal angles of carapace broadly triangular, the latter the more acute and more prominent.

Eyestalks very stout, about as long as, or a little longer than, the anterior border of the carapace, and longer than either the antennular or antennal peduncles; eyes large; ophthalmic scales distant, acute.

Antennal peduncles very little shorter than those of the antennules: acicle doubly curved, reaching almost to end of peduncle, setose : flagellum about twice as long as carapace, nude.

Chelipeds setose, but not so much so as to conceal surface sculpture, the right very remarkably massive.

Right cheliped not twice the length of the carapace: merus shorter than high, its inner lower border alate and spinose, its outer lower border thin prominent and spinose: carpus massive trigonal, broader than long, about as long as the palm; its upper surface studded with coarse spinules which are strongest along the inner border : the palm, which flexes vertically, is broader than long, and its convex outer surface (as of the fingers also) is more or less covered with crescentic granules; *its upper border* is serrated, *and strongly overhangs the base of the dactylus*, its lower border (as of the fixed finger also) is finely and very regularly milled : dactylus not quite so long as the palm, shorter and narrower than the fixed finger, marked with a faint median longitudinal carina on its outer surface : tips of fingers calcareous.

Left cheliped slender, not reaching base of right dactylus: lower border of merus serrated: upper surface of carpus with two longitudinal raised rows of spinules: upper surface of hand with spinules or crescentic granules in longitudinal series: the fingers are about as long as the palm, and the fingers and palm combined are about as long as the carpus.

2nd and 3rd legs moderately setose, surpassing the larger cheliped: a spinule or two may be present on the anterior border of the carpus: the dactyli are stout and nearly as long as the two preceding joints combined.

Length of carapace 8 millim.

The abdominal appendages (exclusive of the uropods) are four in number in the male.

$\frac{9023}{6}$.	Andamans, 20 fath.	"Investigator."
$\frac{1121}{10}$.	Off N. E. coast of Ceylon, 28 fath.	

A variety from the south coast of Ceylon is characterized by the sculpture of the outer surface of the palm and fingers of both chelipeds, where depressed squamiform granules form an unbroken mosaic.

$\frac{1619-22}{7}$	Off S. coast of Ceylon, 32 fath.	"Investigator."

2. Eupagurus zebra, Henderson. Plate XI., fig. 5.

Eupagurus zebra, Henderson, Trans. Linn. Soc., Zool., (2) V. 1893, p. 425, pl. xxxix., fig. 12–15; and J. A. S. B. LXV. 1896, pt. 2, p. 520.

Rostrum broad, triangular, but acute, reaching between the ophthalmic scales and well beyond the antennal angles of the carapace.

Eyestalks comparatively slender, as long as, or slightly longer than, the anterior border of the carapace, reaching nearly to middle of terminal joint of antennular peduncles and nearly to end of antennal peduncles: eyes little expanded; ophthalmic scales acute, distant.

Antennal acicle curved, reaching to end of eye, setose: flagellum more than twice the length of the carapace, sparsely setose.

Chelipeds and legs sparsely setose, the right cheliped vastly the larger. The right cheliped is considerably more than twice the length of the carapace: the merus is smooth and unarmed, and its crest-like inner lower border is hirsute: the carpus, which is rather slender, is as long as the

merus and considerably shorter than the palm, there are a few spinules on its inner border and sometimes on its distal border also, and there may be a few inconspicuous granules scattered on its outer surface: the palm much increases in breadth distally, but its greatest breadth is less than its length; its upper border is not well defined, but the lower border is sharply defined, subcristiform, curved and finely beaded; its outer surface is more or less studded with inconspicuous granules, especially in its lower half; its inner surface is crossed diagonally by a strong ridge: the fingers are compressed, the dactylus, which is slightly longer than the fixed finger, is nearly as long as the upper border of the palm.

Left cheliped very slender, not reaching base of dactylus of right; lower border of merus and upper border of carpus spinose: carpus as long as or longer than hand (fingers included); palm longer than fingers.

2nd and 3rd legs slender, smooth, reaching or slightly surpassing the tip of the larger cheliped: the dactyli are about twice as long as the two preceding joints combined, and the distal half of their concave border has some long capillary spinelets.

Colours in spirit: yellow, with fine blood-red longitudinal stripes: the stripes extend along the whole length of both surfaces of the 2nd and 3rd legs and left cheliped, but are found only on the inner and upper surface of the merus and inner surface of the carpus of the right cheliped: they occur also on the upper surface of the antennal peduncle and acicle, and on the anterior part of the carapace: the antennal flagellum is finely cross-banded with dark red, and sometimes the outer surface of the wrist and hand are finely spotted with red. Henderson regards this colouration as protective, since it resembles the ramuli of a Hydroid.

Length of carapace nearly 8 millim., but an egg-laden female is smaller.

$\frac{1093-4}{10}$.	Off north-east coast of Ceylon, 28 fath.	"Investigator."
$\frac{4731}{10}$.	Persian Gulf, 49-48 fath.	

A variety from the Andamans is characterized by having the whole outer surface of the right carpus and hand finely granular, and the upper surface of the left wrist and palm ornamented with granules or spinules that tend to form longitudinal series.

$\frac{9037}{6}$.	Andamans, 20 fath.	"Investigator."

Distribution: off N. W. coast of Australia, 53 fath.; off Ceylon coast to 28 fath.; Andamans; Persian Gulf to 49 fath.

3. Eupagurus investigatoris, n. sp. Plate XI., fig. 2.

Closely related to *E. zebra*, Henderson.

Rostrum broadly triangular, but acute, reaching between ophthalmic scales and far beyond the antennal angles of the carapace.

Eyestalks slender, slightly longer than anterior border of carapace, reaching to distal third of terminal joint of antennular peduncle and slightly beyond the antennal peduncle: eyes little expanded: ophthalmic scales distant, acute or minutely spinulose at tip.

Antennal acicle curved, setose, reaching beyond middle of terminal joint of antennal peduncle: flagellum $2\frac{1}{2}$ times the length of the carapace, sparsely setose.

Chelipeds setose, sufficiently so on the hands as to obscure though not conceal the sculpture.

The right cheliped, which is much the more massive, is about $2\frac{1}{4}$ times the length of the carapace: the merus is smooth, and its cristiform inner lower border is strongly hirsute and its outer lower border distally spinose: the carpus is longer than the combined ischium and merus, and longer than the palm; its upper border is spinose, its outer surface is longitudinally traversed by a spinulose carina, below which are numerous sharp granules: the palm is very little broader at its distal end than at base, its length is about $1\frac{1}{2}$ times its breadth; the upper and lower borders are well defined and serrated; when denuded, its outer surface (as also of fingers) is thickly studded with coarsish spinules which have a tendency to fall into lines; there is no oblique crest on the inner surface of the palm: the dactylus is considerably shorter than the palm, and is longer than the fixed finger, but narrower.

The left cheliped reaches to the base of the right dactylus: the lower border of the merus is spinose: the carpus is about as long as the combined hand and fingers; its upper surface carries two raised longitudinal rows of spines which are continued on to the palm: the fingers are longer than the palm.

The 2nd and 3rd legs do not quite reach the tip of the larger cheliped, and are smooth and very sparsely setose: the dactyli are about as long as the two preceding joints combined.

Colours in spirit: pinkish yellow, with broad longitudinal red stripes on the merus-joints only of the chelipeds and legs, and a small red patch at the proximal end of the upper surface of the carpal joints.

Length of carapace about 12 millim.

$\frac{4305\text{-}7}{10}$. Off Malabar coast (Calicut), 68—148 fath. "Investigator."

In shells of *Murex*.

4. EUPAGURUS MACARDLEI, n. sp. Plate XI., fig. 3.

Near *E. lanuginosus* DeHaan and *E. brachiomastus* Thallwitz, from both of which it differs in having shortish eyestalks and large reniform eyes It also resembles *E. spinulentus* Henderson, from which it is at once distinguished by its shaggy chelipeds.

Carapace elongate, convex fore and aft, broadened posteriorly. Rostrum hirsute at tip, hardly as prominent as the acute antennal angles of the carapace.

Eyestalks about three-fourths the length of the anterior border of the carapace, reaching beyond the middle of the terminal joint of the antennal peduncle, and not quite reaching the tip of the antennal acicle: they are stout, and gradually broaden up to the reniform eye: ophthalmic scales narrow-foliaceous, subacute, dorsally concave.

Outer angle of 2nd joint of antennal peduncle produced into a long spine: antennal acicle curved, setose, reaching anterior third of terminal joint of peduncle: flagellum about twice as long as carapace, nude.

Chelipeds covered with a long white or grey tomentum, which completely buries the outer surface of the wrist, hand and fingers in a dense shaggy coat, quite obscuring all sculpture.

The right cheliped, which is much the larger, is not quite twice the length of the carapace: the merus has its lower borders serrulate, its upper border transversely rugulose, and its distal border more or less pectinate; its under surface when denuded is seen to be thickly studded with papilliform granules: the subcylindrical carpus is as long as the combined ischium and merus and slightly longer than the palm; its outer surface is beset with stout procurved spines, of which a row just outside the upper border is enlarged, but none of them are visible before the tomentum is removed; its inner and under surfaces are covered with pearly and subsquamiform granules: the palm is about half again as long as broad, both its borders are very well defined, and—like the corresponding borders of the fingers—very regularly and elegantly serrate; its outer surface is traversed by a median longitudinal slightly-raised row of enlarged spines, between which and the upper and lower borders a few granules are scattered: the fingers are of equal size, not quite as long as the palm, and have their tips calcareous and crossed: as already stated, the sculpture of the hand and fingers is only visible after denudation.

The left cheliped does not reach the base of the right dactylus: its merus has the under surface granular and the upper surface transversely rugulose: the upper surface of the carpus carries two raised longitudinal rows of spines, of which those in the outer row are very much the strongest: the lower border of the palm is spinose and there is a median longitudinal

row of spinules or granules on the upper surface of the palm: the fingers are longer than the palm: all these details are only visible after denudation.

The 2nd and 3rd legs slightly surpass the larger cheliped: the edges of their joints are setose, and the anterior edge of the carpus and propodite is spinulose, though in the case of the 3rd pair of legs the spinules tend to wear away: the dactylus is stout, curved, and as long as the two preceding joints combined.

Colours in spirit: dead white.

Length of carapace of egg-laden female 18 millim.

Inhabiting shell of a spiny *Murex*.

$\frac{4462}{10}$ Persian Gulf, 40 fath. "Investigator."

5. Eupagurus carpoforaminatus, n. sp.

This species is characterized by the presence on the under surface of the carpus of the right, and usually also of the left, cheliped, in the adults of both sexes, of a pin-hole foramen or gland. In other respects it resembles the Atlantic and Mediterranean *E. prideauxii* more than any other species.

Rostrum broad, rounded, not nearly so prominent as the well-pronounced antennal angles of the carapace.

Eyestalks about three-fourths the length of the anterior border of the carapace, or a little more, but appearing much shorter by reason of their piriform or grapestone shape, reaching to the distal third of the terminal joint of the antennal peduncle; eyes broadly reniform: ophthalmic scales narrow-foliaceous, mucronate, dorsally concave.

The antennal peduncle reaches to the middle of the terminal joint of the antennular peduncle: antennal acicle curved, smooth, little setose, reaching middle of terminal joint of peduncle: flagellum about thrice as long as the carapace, nude.

Chelipeds tomentose, but not so as to conceal surface sculpture. Right cheliped rather slender, but much larger than the left, about $2\frac{1}{2}$ times the length of the carapace: the merus, which is about as long as the carpus, has its under surface closely granulous, its upper aspect transversely rugulose, and has a few spines on its distal border: the carpus, which is slightly longer than the palm, has its upper border closely spinose and its outer surface spinulose except in a well-defined longitudinal groove just outside of the upper border; sometimes a median longitudinal row of spines on the outer surface of the carpus is enlarged; *near the middle of the under surface of the carpus, in the adult, is a deep pin-hole pit:* the palm is longer than broad and not

broadened distally; its upper border is spinulose, a very regular row of spines runs all along its lower border and on to the fixed finger, and another longitudinal raised row of spinules traverses the middle of its outer surface; its inner surface is granulous: the dactylus is shorter than the palm, the finger-tips, which are calcareous, decussate, and the edges of the fingers are hairy.

The slender left cheliped overlaps the base of the right dactylus: the carpus is as long as the merus and nearly half again as long as the palm, and the fingers are longer than the palm: there is a longitudinal row of spines on the upper surface of the carpus, and, internal to it, an inconspicuous longitudinal row of granules: both borders of the palm are granulous, and on the outer surface of the palm there is a median longitudinal ridge which is more or less granulous. Sometimes near the middle of the under surface of the carpus there is a pin-hole foramen, as in the right carpus.

The 2nd and 3rd legs, which are nude, considerably exceed the larger cheliped: the dactyli are slender, curved, and about twice the length of the propodites: the anterior borders of the carpopodites and propodites are spinose.

There are four abdominal appendages on the left side in the male.

Length of carapace, 10 millim. Inhabits shells of *Ranella*, *Nassaria*, *Nassa*.

$\frac{409\text{-}10}{7}$.	Orissa coast, 25 fath.	"Investigator."
$\frac{1710}{7}$.	Ganjam coast, 26 fath.	
$\frac{1827\text{-}30}{7}$.	Vizagapatam coast, 15—17 fath.	
$\frac{320\text{-}1}{10}$.	Off Colombo, 26½ fath.	
$\frac{4308}{10}$ (3 spec.)	Off Malabar coast (Calicut), 68—148 fath.	

5*a*. EUPAGURUS CARPOFORAMINATUS, var. NEPHROMMA. Plate XI., fig. 4, 4*a*.

This is a deep-sea variety and differs from the sublittoral type in the following particulars:—the eyes are larger and blacker; the whole of the outer surface of the right wrist is covered with coarse spines; the left cheliped reaches a little beyond the middle of the right palm only; the 2nd and 3rd legs reach only a short way beyond the larger cheliped; the pits on the under surface of the carpopodites of both chelipeds are more conspicuous.

Length of carapace 12 millim. Colour in spirit, ivory-white.

$\frac{4296\text{-}7}{10}$.	Between Maldives and C. Comorin, 824 fath.	"Investigator."

6. Eupagurus janitor, n. sp., Plate XI., fig. 6.

As in *Pylopagurus* the enlarged right hand is deflexed at an angle with the wrist to form a door to the shell inhabited (a species of *Turbo*); and somewhat as in *Cancellus* the 2nd and 3rd pairs of legs support the door, though they are not specially modified for the purpose.

Carapace bearing some tufts of setæ, three tufts in a line on either side of the gastric region being conspicuous. Rostrum broadly triangular, but acute, much more prominent than the ill-defined antennal angles of the carapace.

Eyestalks piriform, much shorter than the anterior border of the carapace, reaching into the distal third of the terminal joint of the antennular peduncle, and into the distal half of the same joint of the antennal peduncle. Eyes subreniform, very large and black. Ophthalmic scales distant, narrow-foliaceous, dorsally concave.

Antennal peduncle decidedly longer than antennular peduncle, setose at base: acicle curved, setose, overlapping base of terminal joint of peduncle: flagellum nearly twice as long as the carapace, nude.

Chelipeds both tomentose and hairy, but not so as to entirely conceal surface sculpture; legs hairy.

Right cheliped vastly more massive than the left, short and stout, the hand permanently deflexed almost at right angles with the wrist: merus pyramidal, smooth and polished: carpus triangular, as long as merus and broader than long; there are 2 or 3 claw-like spines at the far end of its upper border, 3 or 4 spines in a longitudinal row on its upper surface, and a short irregular median series of granules on the same surface: the palm is longer and much broader than the wrist and much broader than long; its outer edge forms, with that of the fixed finger, a curve of about 120°, and its inner edge, with that of the dactylus, is almost straight, both edges being thickly setose and very regularly serrated; its extensor surface, when denuded, is found to be studded with granules, of which a few here and there are enlarged: the dactylus is much narrower than the fixed finger and has a median longitudinal row of pearly granules on its upper surface; the finger-tips are calcareous.

The slender left cheliped reaches the base of the right dactylus: the lower border of its merus is spinulose, and the upper surface of its carpus carries two longitudinal rows of spines: the palm is about as long as the fingers, which are blunt and spooned.

The 2nd and 3rd legs slightly exceed the larger cheliped, those of the right side being the longer: their three distal joints are not capable of complete extension in a straight line with the merus and are carried, much

as in *Cancellus*, almost at right angles with the merus, so that those of the right side are closely applied to the convex outer border of the deflexed hand. The legs are stout and beset with bristles: the dactyli end in sharp black claws, the dactylus of the 3rd pair being as long as, that of the 2nd pair being shorter than, its propodite.

The male has 4 abdominal appendages on the right side.

Colours in spirit: eyestalks, chelipeds and legs reddish yellow.

Length of carapace of male nearly 12 millim: a female with eggs is smaller.

From Mr. Stanley Gardiner's Maldive collection (Hululu Malé Atoll); not in the Museum collection.

This species seems to come nearest to *E. hirtimanus* White. In *E. operculatus* Stimpson, from Florida, the right hand forms an operculum as in *E. janitor*, but the two species do not seem to be alike otherwise.

7. Eupagurus sp.

Pagurodes? inarmatus, Alcock (nec Henderson), Cat. Indian Deep Sea Crust., 1901, p. 225.

A small female specimen (No. $\frac{3752}{10}$) from off C. Comorin, 487 fathoms (Investigator). It has a superficial resemblance to *Pagurodes inarmatus* Henderson, but on comparing it with the types of that species in the British Museum I find that the resemblance is only superficial, the gill-plates in the "Investigator" species being not true trichobranchiæ but merely narrow phyllobranchiæ with the apex of each gill-plate bifid.

Pylopaguropsis, n. gen.

Carapace well calcified in front of the cervical groove, moderately broadened posteriorly; rostrum fairly prominent.

Abdomen well developed, soft, spirally coiled, the last tergum and the telson alone well calcified.

Eyestalks moderately stout, of good length; ophthalmic scales separated. Antennal acicle well developed, flagellum long.

External maxillipeds widely separated at base: the exopodites of all three pairs of maxillipeds are flagellate. The palp (endopodite) of the 1st maxillæ has no trace of a flagellum.

Chelipeds dissimilar and unequal, the right vastly the larger: the fingers move in a vertical plane and have calcareous or minutely-corneous tips.

Fourth pair of legs subcheliform, the 5th minutely cheliform: both pairs—as also the uropods—have the usual subterminal pavement of imbricating granules.

In the male, besides the appendages that form the tail-fan, there are only three abdominal appendages (somites 3 to 5): they are placed on the left side and are very unequally biramous. In the female the 1st abdominal somite carries a pair of uniramous appendages, and the next four somites (2—5) each have on the left side an appendage, the first three being large and biramous, the fourth having one ramus rudimentary. The telson and uropods are more developed on the left side than on the right.

The gills, which are particularly large and feathery, are 13 on either side, namely a pair of arthrobranchs on somites IX to XIII and a pleurobranch on somites XI to XIII as in *Paguropsis*, *Paguristes*, *Clibanarius*, *Diogenes* and *Troglopagurus*. The gill-filaments are long and narrow and are in two rows in each gill-plume.

This rather singular genus seems to be restricted to the sublittoral slope of the Bay of Bengal. Its nearest relations seem to be with *Pylopagurus*, a genus whose optimum is in the West Indian region. From *Pylopagurus* it differs (1) in having a pleurobranch on somites XI and XII, so that the number of gills is 13 instead of 11; and (2) in the form of the right hand, which, although it forms an operculum to the tenement and is undoubtedly buttressed for that purpose, is not bent downwards at an angle with the wrist.

It is also closely related to *Eupagurus*, differing however from that genus in the number of gills (13 instead of 11); in the vertical, instead of horizontal, movement of the fingers; and in the fact that the female carries a pair of appendages on the first abdominal somite.

1. Pylopagurops is magnimanus, Henderson. Plate XIII., fig 2.

Pylopagurus magnimanus, Henderson, J. A. S. B., LXV., 1896, pt. 2, p. 522: Ill. Zool. Investigator, Crust., pl. xxxi., fig. 2.

Gastric region well calcified in the form of a well-defined shield: strongly-calcified strips define (1) the hepatic regions, and (2) the posterior three-fourths of the branchial regions.

Rostrum broadly triangular, acute, reaching forward between the ophthalmic scales and well beyond the antennal angles of the carapace.

Eyestalks moderately slender, but distinctly expanded distally; they reach hardly to the middle third of the terminal joint of the antennular, and a little beyond the middle of the same joint of the antennal, peduncle. Ophthalmic scales acute, bearing—like the distal end of the eyestalk—a few lank setæ.

Antennular peduncle more than half the length of the carapace, the terminal joint contributing more than half its length.

The 2nd joint of the antennal peduncle has its outer angle produced into a long setose spine: the acicle, which is strongly curved, with the convexity *inwards*, reaches nearly to the end of the peduncle, its convex inner border being strongly setose: the flagellum is at least as long as the body.

The right cheliped is vastly the larger, and the wrist and hand increase in length, in the male, with age: ordinarily in the male it is about 2½ times the length of the carapace, but in the female it is shorter. The merus has the inner border alate, serrate and thickly hirsute: the carpus, which has the inner angle granulous or spinulous, and strongly prominent to buttress the flexed hand, is as long as the merus, but shorter than the palm; its outer surface is irregularly studded with small acute tubercles which may sometimes form imperfect lines. The hand is strongly curved, with the convexity outwards: the palm greatly increases in height distally, but is usually longer than high, its lower border (and that of the fixed finger) is thin and is finely and bluntly serrulate, its upper border is well defined and granulous; internally the upper surface of the palm is demarcated from the true inner surface by an enormously-strong oblique ridge or buttress: the fingers are very broad, and are compressed, acute and strongly curved, with the convexity outwards, the dactylus, which is about as long as the palm, having a thin, bluntly-serrulated upper border: the whole outer surface of the hand and fingers is covered with subspiniform granules, and the upper surface of the palm with larger, sometimes subsquamiform, granules.

Left cheliped slender, setose, not reaching base of right dactylus: the hand and fingers are curved inwards, the fingers being longer than the palm: the lower border of the merus and the upper border of the carpus are spinose.

The 2nd and 3rd legs in the male just surpass, but in the female surpass considerably, the large cheliped: the dactylus is stout, strongly curved, plumose on the convex upper border, and about as long as the two preceding joints combined. Except for a spinule or two on the anterior border of the carpus, these legs are unarmed.

In the female the posterior ramus of the first three unpaired abdominal appendages is particularly broad and stout, and the narrow anterior ramus of the fourth unpaired appendage is particularly long and narrow.

Length of carapace about 20 millim.

Colours in spirit biscuit yellow: in life, either bright red like the *Rostellaria* whose abandoned shell it inhabits, or "legs crimson dotted with yellowish white, under surface of joints white."

This species has been found only in shells of *Rostellaria delicatula*, and its right hand forms an almost exact operculum to the shell.

$\frac{399-402}{7}$.	Off Orissa coast, 68 fathoms.	"Investigator."
$\frac{1765-66}{7}$.	Off Ganjam coast, 93—89 fath.	
$\frac{6173-83}{9}$.	Off Ganjam coast, 98—102 fath.	
$\frac{4220}{7}$.	Off Pulicat, 133 fath.	
$\frac{4263-69}{10}$.	Northern limits of B. of Bengal, 65 fath.	
$\frac{4270}{10}$.	Off Ceylon, 180—217 fath.	

TOMOPAGUROPSIS, n. gen.

The gastric shield is the only part of the carapace that is well calcified. Rostrum distinct, though short and broad.

Abdomen well developed, soft, spirally coiled, only the telson and the last tergum are well calcified.

Eyestalks of moderate length and stoutness, eyes well developed, ophthalmic scales little distant. Antennal acicle large, flagellum setose.

External maxillipeds widely separated at base: the exopodites of all three maxillipeds are flagellate: the palp (endopodite) of the 1st maxillæ has a recurved flagellum.

Chelipeds not dissimilar, but unequal, the right being a little the larger: the fingers move in an almost horizontal plane as in *Paguristes*, and their tips are corneous.

Fourth pair of legs subcheliform, 5th pair minutely cheliform: in both—as also on both rami of the tail-fan—is the usual subterminal pavement of imbricating granules.

In the male the first abdominal segment carries a pair of short slender appendages, and the next four somites (2 to 5) have each, on the left side, an unequally-biramous appendage. In the female there are only the four unequally-biramous appendages on the left side (somites 2 to 5). The telson and uropod are more developed on the left side.

The gills are 13 in number on either side, arranged as in *Paguropsis*, *Paguristes*, *Clibanarius*, *Diogenes*, *Troglopagurus*, and *Pylopaguropsis*. The gill-filaments, which are in two rows in each gill-plume, are very long and lax, and are bifid at tip.

Tomopaguropsis agrees with *Tomopagurus* E. and B. in the fact that the male carries a pair of appendages on the first segment of the abdomen; but

it differs from it entirely in the number of the gill-plumes and form of the gill-filaments, in the presence of a well developed flagellum to the palp of the 1st maxillæ, in the tendency of the chelipeds to be subequal, and in having the finger-tips extensively corneous.

Tomopaguropsis is also closely related to *Eupagurus*, from which however it differs in all the points just mentioned, and in the possession by the male of a pair of appendages on the first abdominal segment.

At present only two species of this genus are known, namely, *Tomopaguropsis problematica* (= *Eupagurus ? problematicus*, Edw. and Bouv.) from the West Indian region, 125 to 288 fathoms, and *T. lanata*, here described, from off the west coast of India and Ceylon, 142 to 400 fathoms. The restriction of this singular and somewhat generalized form to the sublittoral zones of the West Indies and of the Indian Peninsula is one of those remarkable facts of distribution that I have already sufficiently emphasized.

1. Tomopaguropsis lanata, n. sp. Plate XIII., fig. 4.

Carapace very thin except in the well-calcified gastric region and in certain parts of the edge of the cervical groove: even the cardiac region, though better calcified than other parts behind the cervical groove, is thin. Rostrum and antennal angles of carapace broad but acute, the rostrum slightly the more prominent.

Eyestalks moderately stout, slightly broadened distally, dorsally setose, surpassing to no very great extent the penultimate joint of the antennular peduncle and reaching nearly to the middle of the terminal joint of the antennal peduncle. Eyes very black, ophthalmic scales long, stout, dorsally inflated, acute.

Outer angle of 2nd joint of antennal peduncle produced as a long, stout setose spine: antennal acicle stout, curved, reaching to end of peduncle, its inner border strongly setose: flagellum setose, more than 1½ times length of carapace.

The exposed extensor surfaces of the chelipeds and legs are very hairy, but not so thickly so as to entirely conceal the surface sculpture.

The chelipeds are similar in form and in details of sculpture, but the right, though not much longer, is somewhat larger.

The right cheliped is a little more than twice the length of the carapace: the trigonal merus is as long as the trigonal carpus, and except for a few transverse ripplings on its upper face and a few granules or spinules on its lower face, is smooth: the carpus is longer than broad and longer than the palm; its inner border is spinose, and there are numerous spinules and granules on the lower part of its outer surface, but a shallow groove parallel

with and just outside of the inner border is quite smooth : the palm is longer than broad, but hardly as long as the dactylus ; its upper border is spinose, and there are several longitudinal rows of spinules in the lower half of its outer surface, but the upper half is smooth : the cutting edges of the fingers are corneous in almost half their extent.

The 2nd and 3rd legs are stout and surpass the larger cheliped by about half the length of their dactyli : the upper surface of their joints is transversely rugulose : the dactyli are stout, curved, and at least as long as the two preceding joints combined.

In the female the anterior ramus of the first three abdominal appendages is slender and of remarkable length.

Colours in spirit : the thoracic appendages and the calcified part of the carapace are of the dull chalk-white colour seen in *Munidopsis*.

Length of carapace about 20 millim.

$\frac{1096}{10}$	Off Colombo, 142—400 fath.	"Investigator."
$\frac{2028—9}{10}$.	Off Travancore coast, 360 fath.	

COENOBITIDÆ, Dana.

Coenobitidæ, Dana, U. S. Expl. Exp., Crust., pt. I., 1852, pp. 432, 435 : Stimpson, Proc. Ac. Nat. Sci. Philad. (1858) 1859, p. 232 ; Haswell, Cat. Austral. Crust., 1882, p. 159 : Henderson, Challenger Anomura, 1888, p. 49 : Stebbing, Hist. Crust., 1893, p. 155 : Ortmann, in Bronn's Thier Reich, Malacostraca, 1900, p. 1146 : Young, Stalk-eyed Crust. W. Indies, p. 357.

Carapace well calcified ; either elongate, or greatly broadened in its posterior half. Rostrum either almost obsolete, or very prominent and completely concealing the ophthalmic somite. Thoracic sterna broad behind the chelipeds.

Abdomen either soft and spirally coiled in adaptation to a mollusk shell, or broad, symmetrical, dorsally well-calcified, and simply flexed.

Ophthalmic scales present. The antennular peduncle is of great length, the first joint deflexed and stout, the other two joints slender and cylindrical ; the flagella compressed and truncated at tip. Antennal peduncle compressed, the acicle inconspicuous.

External maxillipeds approximated at base, the flagellum of the exopodite, as also of that of the 2nd maxillipeds, very much reduced.

Chelipeds massive, the left larger than the right. Legs of the 2nd and 3rd pairs elongate, those of the 4th and 5th pairs reduced, the 4th pair being cheliform or subcheliform, the 5th pair cheliform.

It is unusual for the male to possess recognizable abdominal appendages other than the telson, but the female has a large biramous appendage on the left side of each of the abdominal somites 2, 3, and 4. The gills are phyllobranchiæ and are more or less subsidiary to respiration, which is largely effected by other means.

The *Coenobitidæ* are land-hermits, visiting the sea occasionally, and in the case of the female periodically to hatch-off her eggs. They are characteristic of the tropical Indo-Pacific from East Africa to Panama, but the family is also represented in tropical parts of the Atlantic sea-board, both in America and West Africa.

The family contains but two genera—*Coenobita* and *Birgus*.

In *Coenobita* the body is of the common Pagurine form, the carapace being elongate and the abdomen soft and spirally coiled, and the 4th and 5th thoracic legs have the usual Pagurine proportions; also the rostrum is obsolete.

In *Birgus* the carapace, though Pagurine anteriorly, is almost crab-like posteriorly owing to the great development of the gill-chambers; the abdomen is symmetrical and simply flexed, and is dorsally protected by large, overlapping, strongly-calcified terga; the 4th pair of legs are chelate and are very much longer and stouter than the 5th pair, the latter being usually carried inside the gill-chambers; and the rostrum is particularly well developed. There is but one species of *Birgus*, *B. latro*, the "robber-crab," so called from its liking for coconuts, which it was supposed to steal from the trees.

Coenobita, Latr.

Coenobita, Latreille, Fam. Nat. du Règne Anim. 1826, p. 276; and in Cuvier, Règne Anim. (2) IV., 1829, p. 77: Milne Edwards, Hist. Nat. Crust., II. 1837, p. 238: De Haan, Faun. Japon. Crust., 1849, p. 203; Dana, U. S. Expl. Exp. Crust., pt. I., 1852, p. 435: Stimpson, Proc. Acad. Nat. Sci. Philad. (1858) 1859, p. 232: Hilgendorf in v. d. Decken's Reis. Ost-Afrika, Crust. III. i. 1869, p. 97: Boas, Vid. Selsk. Skr., 6 Raek. Nat. o. math. Afd. I. 2, 1880, pp. 115, 190: Haswell, Cat. Austral. Crust., 1882, p. 160; Henderson, Challenger Anomura, 1888, p. 50: Bouvier, Bull. Soc. Philomath., Paris (8) II., 1889-90, pp. 143 and 194: Ortmann, Zool. Jahrb., Syst., VI. 1892, p. 315, and in Bronn's Thier Reich, Malacostraca, p. 1146: Stebbing, Hist. Crust., 1893, p. 159: Borradaile in Stanley Gardiner's Fauna and Geography of the Maldive Islands, I. i., p. 69: Young, Stalk-eyed Crust. W. Indies, &c., 1900, p. 358.

Carapace elongate, more than ordinary contracted and compressed anteriorly—the contraction and compression involving all the appendages, from the eyes to the external maxillipeds—most strongly calcified anteriorly, but well calcified everywhere except in certain parts of the branchiostegites. Rostrum almost obsolete.

Eyestalks and ophthalmic scales juxtaposed, the former generally compressed : eyes terminal and lateral.

Antennular peduncles extremely long : the flagella compressed, rigid, and truncated at tip, the upper flagellum being much longer and broader than the lower. Antennal peduncles compressed, the acicle small and often fused with the 2nd joint, the flagellum long, coarse, and stiffish.

External maxillipeds juxtaposed at base : the exopodite of the first pair of maxillipeds non-flagellate ; the flagella of the exopodites of the 2nd and 3rd maxillipeds short, hairy and non-segmented : the palp of the 1st maxillæ non-flagellate.

Chelipeds unequal, the left being very much the stouter, all the joints short, broad, and clumsy-looking : the fingers move vertically, and have the extreme tip corneous or calcareous.

2nd and 3rd legs stout, not, or not much, longer than the larger cheliped. 4th pair of legs in a sort subcheliform, the dactylus being minute and the propodite forming a large suboval plate. 5th pair of legs cheliform, not shorter, and not much slenderer, than the 4th. The subterminal pavement of corneous imbricating granules is very well developed both on the 4th and 5th pair of legs and on the abdominal appendages that form the tail-fan.

The abdomen is soft, fleshy, and spirally coiled. Besides the appendages of the 6th abdominal somite (which are better developed on the left side than on the right) the female possesses 3 good-sized biramous appendages (somites 2—4) on the left side, which are either altogether absent, or are represented by rudiments (that are easily lost in spirit specimens) in the male.

The gills are phyllobranchiæ, and are 14 in number on either side arranged as in *Pagurus*, but the first four (the arthrobranchs of the external maxillipeds and chelipeds) are non-functional rudiments. The 10 functional gill-plumes are insufficient for respiration, and subsidiary respiration is carried on partly by the wall of the gill-chamber, and partly by the soft abdominal integument, which sometimes (anteriorly) grows out into excrescences for the purpose ; for the members of the genus *Coenobita*, though they occasionally visit the sea, are "land-crabs", and often live at a distance from the shore.

The distribution of *Coenobita* is very like that of *Clibanarius*, to which genus (and to *Calcinus*) *Coenobita* is closely related. The majority of Coenobites are found in the coast lands and islands of the Indo-Pacific, from the Red Sea and East Africa to the eastern bounds of Polynesia. A few species extend to the Pacific coast of America, from California to Colombia and the Galapagos Is. One species occurs on the Atlantic seaboard of tropical

America, from Brazil to Florida and the Bermudas ; and two or three species are found in tropical West Africa. Two of the species found in West Africa have a most extensive range eastwards, one to Tahiti, the other to Panama.

The Coenobites form one of the most characteristic elements of the population of small tropical islands—especially of islands uninhabited by man —and can be observed to perfection (locally) in the smaller islets of the Andaman Archipelago and of the Laccadives. In the Andamans, though they swarm most in the belt of open jungle that fringes the beach, they are common enough in the depths of the forest.

They seem to prefer stout, heavy shells (e. g. *Turbo* and *Nerita)*, but they are by no means fastidious about their tenement, and very large individuals, who find a difficulty in getting fitted, will make shift with the half of an empty coconut, or will even go unprotected.

They are very lively during rain, but they do not have much to do with the sea, though the females go to the sea to hatch-off their eggs, for the larvæ are aquatic.

Though on occasion scavengers and carnivorous, they are chiefly vegetable-feeders, and will even climb trees in search of food.

A good account, both of the morphology and of the manner of life of the Coenobites, is contained in Borradaile's *Land Crustaceans of Minikoi*, published in Stanley Gardiner's *Fauna and Geography of the Maldive and Laccadive Archipelagoes.*

Key to the Indian species of the genus Coenobita.

I Antennal acicle not fused with the 2nd joint of the peduncle: eyestalks not strongly compressed: a brush of hairs on the inner surface of the right palm only ... — — — — *C. clypeatus.*

II. Antennal acicle fused with the 2nd joint of the peduncle: eyestalks strongly compressed: a brush of hairs on the inner surface of both palms :—

1 An oblique file of upright laminar teeth (stridulating mechanism) on the upper part of the outer surface of the left palm :—

a. Outer surface of propodite of third left leg flat, and separated from the anterior surface by a well-defined crest ; coxa of fifth right leg of male moderately produced, more so than the left — — — *C. rugosus.*

b. Outer surface of propodite of third left leg convex and not sharply separated from the anterior surface : coxa of fifth right leg of male produced into a long curved tube *C. perlatus.*

2. No stridulating mechanism on the left palm : the coxæ of the 5th legs are hardly more prominent in the male than they are in the female — — — ... — *C. cavipes.*

1. Coenobita clypeatus, Latr. Plate XV., fig. 1, 1*a*.

Coenobita clypeata, Latreille, Fam. Nat. Règne Anim, 1826, p. 277, and Cuvier, Règne Anim. (2) IV., 1829, p. 77: Milne Edwards, Hist. Nat. Crust., II., 1837, p. 239: Dana, U. S. Expl. Exp., Crust., pt., I., 1852, p. 473, pl. xxx., fig. 4: Heller, Novara Crust., 1865, p. 82: Hilgendorf in v. d. Decken's Reisen in Ost-Afr., III, i. 1869, p. 98, pl. vi., fig. 3*c*, 4*c*: Richters in Möbius, Meeresf. Maurit., 1880, p. 161: Miers, Ann. Mag. Nat. Hist. (5) V., 1880, p. 371: de Man, Arch. f. Nat., LIII. i. 1887, p. 452, and Abh. Senckenb. Nat. Ges., XXV., 1902, p. 741, pl. xxiv., fig. 44: Henderson, Challenger Anomura, 1888, p. 51: Bouvier, Bull. Soc. Philom. Paris (8) II., 1889-90, p. 143: Ortmann, Zool. Jahrb., Syst., VI., 1892, p. 316, pl. xii. fig. 20: Whitelegge, Mem. Austral. Mus, III., 1897, p. 140: Borradaile, P. Z. S., 1898, p. 459; and Stomatop. & Macr. Willey's Exp., 1899, p. 425; and Faun. & Geogr. Maldive and Lacc. Arch., I. i. 1901, pp. 68, 97: Nobili, Ann. Mus. Genov. (2) XX., 1900, p. 494.

There is no confusion about this well characterized species, except as regards the name, which, as Hilgendorf has pointed out, is likely to be challenged by zoological lawyers.

Carapace punctate, most profusely so in the anterior part which is dorsally strongly convex.

Though their ventral edge is sharp, the eyestalks appear subcylindrical; they only slightly surpass the penultimate joint of the antennal peduncle. Ophthalmic scales laminar, their free edge serrulate or crenulate.

The antennular peduncles are more than one-fifth longer than the carapace, their basal joint is almost as long as the entire antennal peduncle. Antennal acicle compressed, almost lanceolate, not fused with the 2nd joint of the peduncle.

In the chelipeds the meri are transversely more or less rugulose, and the carpi are studded irregularly with small pustular tubercles—becoming almost spiniform near the inner edge—the tips of which are corneous and dark-coloured: similar pustular or vesicular tubercles stud the hands and fingers, but on the outer surface of the large (left) hand and dactylus the horny tips are worn or absent. Along the upper part of the inner surface of the right palm *only* there is a thick brush or mat of long coarse hairs.

The 2nd and 3rd legs do not, or hardly, surpass the larger cheliped: in the last four joints the outer surface is more or less rugulose and punctate, and in the last three joints the anterior surface is more or less beset with small, dark-corneous-tipped subspiniform tubercles, which are most numerous on the dactyli: the lower edges of the legs, especially of those of the right side, are somewhat setose. On the concave inner surface of the dactyli of the left legs there is a fine linear, corneous-serrate ridge, although there is no special stridulating mechanism on the left cheliped.

In the male the coxæ of the 5th pair of legs are equally salient ventrally, but are not more prominent than they are in the female.

Colours in spirit: dusky violet or livid purple.

Length of carapace of a male 62 millim. (2½ inches).

7725/6	Yé River, Burma. (6)	"Investigator."
4314/10	Suhelipar, Laccadives.	
[1566	"South Seas."	Purchased.]

Geographical range: from tropical east Africa to Tahiti: also, according to Bouvier, tropical west Africa.

Coenobita clypeatus grows to a large size, and sometimes finds difficulty in fitting itself with a shell. Other observers, besides myself, have seen it using the half of a coconut shell; and I once, at Minnikoy, saw a very large individual going about without protection of any sort.

2. Coenobita rugosus Edw. Plate XIV., fig. 3, 3*a*.

(C. compressus var. rugosus, Bouv.)

Coenobita rugosa, Milne Edwards, Hist. Nat. Crust. II. 1837, p. 241: Krauss, Sudafr. Crust., 1843, p. 58: De Haan, Faun. Japon. Crust., 1849, p. 212: Dana, U. S. Expl. Exp., Crust., pt. I., 1852, p. 471, pl. xxx. fig. 1: Stimpson, Proc. Acad. Nat. Sci. Philad., 1858 (1859), p. 245: Heller, SB. K. Akad. Wien, XLIV., 1861, p. 254: A Milne Edwards, in Maillard's l'ile Reunion, 1862, Annexe F, p. 13: Heller, Novara Crust., 1865, p. 82: A. Milne Edwards, Nouv. Archives, du Mus. IV. 1868, p. 72. *Coenobita rugosus*, Hilgendorf, in v. d. Decken's Reisen Ost-Afr. III. i. 1869, p. 99, pl. vi. fig. 2, 3*a*, 4*b*; and MB. K. Akad. Berlin, 1878 p 824. *C. rugosa*, Kossmann, Reise roth. Meer., Malacostr., 1877, p. 79: Targioni Tozzetti, "Magenta" Crust. 1877, p. 232, pl. xiii. fig 6 *a—c*: Miers, Ann. Mag. Nat. Hist. (5) II., 1878. p. 410; and Phil. Trans. Roy. Soc. Vol. 168, 1879 p. 492: de Man, Notes Leyden Mus. II. 1880, p 185 *C. rugosus*, Richters in Möbius, Meeresf. Maurit. 1880, p. 160, pl. xvii. fig. 14—17: Lenz and Richters, Abh. Senckenb. Ges. XII., 1881, p. 426. *C. rugosa*, Haswell, Cat. Austral. Crust. 1882, p. 160. *C. rugosus*, Ozorio, Journ. Sci. Lisb. XI., 1887, p. 222; de Man, Arch. f. Nat. LIII., 1887, i., p. 452. *C. rugosa*, Henderson, Challenger Anomura, 1888, p. 51; and Trans. Linn Soc., Zool. (2) V., 1893, p. 410: Bouvier, Bull. Soc. Philom. Paris (8) II., 1889-90, p. 144. *C. rugosus*, Ortmann, Zool. Jahrb., Syst. VI. 1892, p. 317, pl. xii. fig. 22: Zehntner, Rev. Suisse Zool., II., 1894, p. 189. *C. rugosa*, Whitelegge, Mem. Austral. Mus., III., 1897, p. 140. *C. rugosus*, Borradaile, P. Z. S., 1898, p 460; and Stomap. and Macr. Willey's Exp., pp. 397, 425; and in Faun. and Geogr. Maldive and Laccadive Arch., 1901, pp. 68, 97: Nobili, Ann. Mus. Genov, (2) XX., 1899, pp. 248, 494: Lanchester, P. Z. S. 1902, II., p. 368: Schenkel, Verh. Nat. Ges. Basel, XIII., 1902, p. 569.

Coenobita compressa var. *rugosa*, Bouvier, Bull. Soc. Philom. (8) III., 1890-91, p. 21, and (8) V., 1892-93, p. 25.

Coenobita clypeata, Owen, Zool. "Blossom," Crust., p. 85, pl. xxv. fig. 3.

Coenobita compressus, de Man, Abh. Senckenb. Nat. Ges. XXV., 1902, p. 742, pl. xxiv. fig. 45.

Carapace punctate behind, punctate and granulous in front of the cervical groove, the gastric region hardly at all convex.

Eyestalks compressed, reaching beyond the middle of the terminal joint of the antennal peduncle, dorsally scabrous. Ophthalmic scales narrow, sharply acuminate.

The antennular peduncles are not quite as long as the carapace. The peduncles of the antennæ reach to about the middle of the 2nd joint of

those of the antennules. Antennal acicle fused with the 2nd joint of the peduncle.

The exposed surfaces of the legs are punctate and rugulose. In the chelipeds the outer surface of the hands is beset with small vesiculous granules, and on the upper part of the outer surface of the left hand there is a "stridulating organ" formed by an oblique series of oblique up-standing laminar teeth, which are in no way confused with the small vesiculous granules of the surface. In the upper part of the inner surface of both palms there is a thick triangular brush of long hairs, below which, on the left palm, is a strong longitudinal ridge.

The 2nd legs equal, and the 3rd slightly surpass, the larger cheliped; their anterior and inferior edges are setose, though in the case of the third left leg the setæ are few and inconspicuous: the dactyli are compressed, triangular and scabrous. In the 3rd left leg the outer surface of the propodite and dactylus is perfectly flat, smooth though punctate, and is separated from the anterior surface by a well-marked crest. On the concave under surface of the dactyli of the 2nd and 3rd left legs there is a very fine longitudinal ridge which can be played against the file of teeth on the upper surface of the left cheliped. The coxæ of the 5th pair of legs is produced ventrally in both sexes, more so in the male than in the female and more so in the case of the right coxa of the male than in the left.

Colours in spirit: yellowish, usually a dark patch on the outer surface of the left palm.

This species, which is very common in the Andamans, where it swarms on the dry beach and in the opener parts of the jungle just above the shore, does not grow to a large size, individuals with a carapace 30 millim. long being very much rarer than those with a carapace from 12 to 20 millim. in length: the carapace of the largest egg-laden female in the Indian Museum measures 24 millim.

560	Nicobars.	J. Wood-Mason.
$\frac{8644}{6}$	Andamans.	G. M. J. Giles. (30).
$\frac{2445-49}{7}$.	Gt. Coco I., Andamans.	A. Alcock.
$\frac{1466}{10}$: $\frac{4352-55}{10}$.	Andamans.	A. R. S. Anderson.
$\frac{7711}{6}$.	Mergui.	"Investigator."
$\frac{1811-23}{10}$.	S. India.	Trevandrum Museum.
822	Galle.	J. Anderson. (10).
1571	Betra Par, Laccadives.	J. Armstrong. (3).
[13.	"South Seas."	Purchased.]
[452.	Samoa.	Purchased.]

Geographical range: tropical west Africa: Red Sea littoral and east Africa, through the Indo-Pacific to Vancouver, Lower California, and Coquimbo.

3. Cœnobita perlatus, Edw. Plate XIV., fig. 2, 2*a*.

Cœnobita perlata, Milne Edwards, Hist. Nat. Crust., II., 1837, p. 242, and in Cuvier, Règne Anim. (3), pl. xliv. fig. 1: DeHaan, Faun. Japon., Crust., 1849, p. 213: Brocchi, Ann. Sci. Nat. Zool. (6) II., 1875, Art. 2, p. 40, pl. xv. fig. 45–47 (male orifice). *C. perlatus*, Richters in Möbius Meeresf. Maurit., 1880, p. 160. *C. perlata*, Miers, Zool. H. M. S. "Alert," 1884, pp 519, 555: Henderson, Challenger Anomura, 1888, p. 52: Walker, Journ. Linn. Soc, Zool, XX. 1887, p. 112: Bouvier, Bull. Soc. Philom., Paris, (8) II, 1889 90, p. 148. *C. perlatus*, Ortmann, Zool. Jahrb., Syst., VI., 1892, p. 319, pl. xii. fig. 25: Borradaile, P. Z. S., 1898, p. 459; and Stomatop. & Macr. Willey's Exp., 1899, pp. 397, 425; and Fauna & Geogr. Mald. & Lacc. Arch., I i. 1901, pp. 68, 97: Nobili, Ann. Mus. Genov. (2) XX., 1900, p. 495: Lanchester, P. Z. S., 1902, II., p. 369.

Carapace punctate behind, thickly spotted with light-tipped vesiculous granules in front of the cervical groove, the gastric region little convex.

Eyestalks compressed, dorsally vesiculo-granulose, reaching beyond the middle of the terminal joint of the antennal peduncle. Ophthalmic scales narrow, acute.

Antennular peduncle not quite as long as the carapace. The peduncle of the antenna does not reach the middle of the 2nd joint of that of the antennule. Antennal acicle fused with the 2nd joint of the peduncle.

The exposed surfaces of the chelipeds and legs are copiously spotted with small, light-coloured, dark-corneous-tipped tubercles, the corneous tips of which have a tendency to become spiniform and are true spines on the dactyli and along the inner edge of the propodites.

On the upper part of the outer surface of the left cheliped there is a stridulating organ formed by an oblique series of oblique laminar tubercles which gradually pass into the ordinary corneous-tipped tubercles of the general surface. In the upper part of the inner surface of both palms there is a thick triangular brush of long hairs.

The 2nd legs equal, the 3rd slightly surpass, the larger cheliped: the inferior surface of those of the right side is setose. The dactyli are triangular in section, and on the concave inner surface of the left dactyli there is a fine longitudinal ridge, the edge of which is corneous and very finely pectinate. In the 3rd left leg the outer surface of the propodite is convex and is not separated from the anterior surface by any crest.

In the male the coxa of the 5th right leg is produced into a long curved compressed tube.

Colours in spirit: chelipeds, legs, and anterior half of carapace bright cinnabar red profusely spotted with yellow (the tubercles); telson and posterior part of carapace duller red.

Length of carapace 50 millim.

This species is common in the jungles of the Andamans often far from the shore.

7	Nicobars.	J. Wood-Mason. (5).
$\frac{6717}{4}$.	Andamans.	R. D. Oldham.
$\frac{2417\text{-}18}{7}$	Lit. Coco I., Andamans.	A Alcock.
$\frac{2441\text{-}4}{7}$: $\frac{4748}{10}$	Gt. Coco I., Andamans.	
$\frac{4356\text{-}59}{10}$.	Andamans.	A. R. S. Anderson. (16)
$\frac{4260}{10}$.	Suhelipar, Laccadives.	"Investigator."
[1243.	Society Is.	Otago Museum.
[1294.	Samoa and Viti.	Purchased. (3).

Geographical range: from Mauritius and Seychelles through the Indo-Pacific to Samoa.

4. Cœnobita cavipes, Stimpson, Bouvier. Plate XIV., fig. 1.

Cœnobita cavipes, Stimpson, Proc. Acad. Nat. Sci. Philad. (1858) 1859, p. 245: Bouvier, Bull. Soc. Philom. (8) II., 1889 90, p. 143: Nobili, Ann. Mus. Genov. (2) XX., 1900, p. 495: de Man, Abh. Senckenberg. Nat. Ges., XXIV., 1902, p. 743, pl. xxiv. fig. 46.

Cœnobita violascens, Heller, Verh. zool. bot. Ges. Wien, XII., 1862, p. 524; and Novara Crust., 1865, p. 82, pl. vii. fig. 1: Hilgendorf, in v. d. Decken's Reisen Ost-Afr., III. i. 1869, p. 99, pl. vi. fig. 3 *b*; and MB. Akad. Berl., 1878, p. 825: de Man, Archiv f. Nat., LIII., 1887, i, p. 453; and Journ. Linn. Soc., Zool., XXII., 1888, p. 255.

Cœnobita compressa, Miers, Ann. Mag. Nat. Hist. (5) V, 1880, p. 371.

Cœnobita compressus, Ortmann, Zool. Jahrb., Syst., VI. 1892, p. 318, pl. xii. fig 23: Henderson, Trans. Linn. Soc., Zool. (2) V., 1893, p. 410: Borradaile, Stomatop, and Macr. Willey's Exp., 1899, pp. 396, 397, 398, 425; and Fauna and Geogr. Mald. and Lacc. Arch. I. i. 1901, p. 97: Nobili, Ann. Mus. Genov. (2), XX, 1900, p. 495: Lanchester, P. Z. S., 1902, II., p. 368.

The species here described is, I think, undoubtedly the *C. violascens* of Heller from the Nicobars. Ortmann, and those who have followed him,

make *C. violascens* a synonym of *C. compressus*, Edw., a course which had previously been suggested by Hilgendorf and de Man. Bouvier, however (Bull. Soc. Philom, Paris (8) II., 1889-90, p. 147), while accepting the suggestion of Hilgendorf and de Man as to the identity of *C. compressus* and *C. violascens*, had, prior to the publication of Ortmann's opinion, decided that *C. compressus* and *C. rugosus* are varieties of a single species. On this last point, the views of Bouvier, who has Milne Edwards' types at his disposal, must be regarded as final, though they certainly do not clear up the position of *C. violascens*. My own opinion is that *C. violascens* Heller is the same as *C. cavipes* Stimpson, and that *C. compressus* Ortmann (but not *C. compressus* Bouvier) must be included with them.

Carapace, in front of the cervical groove, punctate, antero-laterally scabrous and slightly setose, the gastric region little convex.

Eyestalks compressed, dorsally punctate, not reaching the middle of the terminal joint of the antennal peduncle. Ophthalmic scales narrow, acute.

Antennular peduncle as long as the carapace. The peduncles of the antennæ reach the middle third of the 2nd joint of those of the antennules. Antennal acicle fused with the 2nd joint of the peduncle.

The chelipeds and legs are comparatively smooth. In the chelipeds the meri are very finely and inconspicuously rugulose, the carpi are punctate and have some small corneous-tipped vesicular granules in the upper part of their outer surface; the right palm has its outer surface studded with similar spiniform granules, with a few bristles interspersed; the lower part of the outer surface of the left palm is quite smooth, but the upper part is studded with vesicular granules with corneous tips. In the upper part of the inner surface of both palms there is a thick brush of long hairs.

The 2nd and 3rd legs do not surpass the larger cheliped: except for some dark corneous-tipped granules or spinules along the anterior surface of the three distal joints their surfaces are merely finely punctate: their borders, especially the under border, are setose. The dactyli of the right side are subcylindrical, those of the left side subtriangular. In the 3rd left leg the dactylus is somewhat compressed and its outer surface is flat: the outer surface of the propodus also is nearly flat, but is not separated from the anterior surface by a crest except quite at its distal end. The concave inner surface of the 2nd and 3rd left dactyli is traversed by a very fine longitudinal line, the edge of which is corneous. The coxæ of the 5th pair of legs are a little more salient in the male than in the female: in both sexes the left is slightly more prominent than the right

Colours in spirit: chelipeds, legs and carapace livid yellow, the chelipeds and legs sometimes dusky reddish.

Length of carapace of a large female 31 millim.

6.	Penang	F. Stoliczka.
9, 108	Andamans	J. Wood-Mason. (6).
4747/10	Andamans or Nicobars	J. Wood-Mason. (14).
8096/6.	Mergui.	Dr. J. Anderson.

Geographical range: from east Africa through the Malay and East Indian Archipelago to the Liu Kiu Islands.

Birgus, Leach.

Birgus, Leach, Trans. Linn. Soc. XI., 1815, p. 337: Desmarest, Consid. Gén. Crust., 1825, p. 180: Milne Edwards, Hist. Nat. Crust., II., 1837, p. 244: DeHaan, Faun. Japon. Crust., 1849, p. 203: Dana, U. S. Expl. Exp., Crust., pt. I., 1852, p. 435: Stimpson, Proc. Acad. Nat. Sci. Philad. (1858) 1859, p. 232: Boas, Vid. Selsk. Skr., 6 Ræk., naturvid. og math. Afd. I., 2, 1880, p. 191: Henderson, Challenger Anomura, 1888, p. 49: Stebbing, Hist. Crust., 1893, p. 156: Ortmann, in Bronn's Thier Reich, Malacostraca, p. 1147.

Carapace contracted anteriorly as in *Cœnobita*, but greatly expanded across the branchial regions where its breadth equals its length, well calcified everywhere, though most strongly so in the gastric region. Rostrum prominent.

Eyestalks subcylindrical: ophthalmic scales juxtaposed, hidden beneath the vertically deflexed subrostral end of the carapace.

Antennular peduncle nearly as long as the carapace: the flagella compressed, truncated at tip; the upper very much longer and stouter than the lower.

Antennal peduncle compressed: the acicle fused with the 2nd joint: the flagellum stout, but very long.

The external maxillipeds are in contact at base: the exopodite of the 1st maxillipeds is non-flagellate, those of the 2nd and 3rd have a very short, non-segmented flagellum. The endopodite (palp) of the 1st maxillæ is non-flagellate.

Both chelipeds are massive, the left more so than the right; all the joints are short, broad, and heavy: the fingers move obliquely but much nearer to the horizontal than to the vertical.

The 2nd and 3rd pairs of legs are extremely stout ; the 4th and 5th pairs are cheliform, the 4th being twice as long as and many times more bulky than the 5th which are tucked up within the gill-chambers.

Abdomen shorter than the carapace, broad, straight, symmetrical, simply flexed beneath the thorax : all the terga are well calcified, the 2nd 3rd, 4th, and 5th being broad overlapping plates with small subsidiary platelets (pleura) on either flank : the 6th tergum and the telson are very much reduced in size, are widely separated from the 5th, and are quite ventral in position. In the male the only abdominal appendages present are those that flank the telson, which, like the telson, are rudimentary, though symmetrical : in the female, in addition, there are large hairy biramous appendages on the left side of the 2nd, 3rd, and 4th abdominal somites.

The gills, which are phyllobranchiæ and are 14 in number on either side arranged as in *Pagurus*, are very small, and respiration is chiefly effected by the lining-membrane of the capacious gill-chambers, which is greatly thickened and has its surface enormously increased by abundant arborescent growths.

The genus *Birgus* is represented by a single species, the well-known *Birgus latro*, which, among the tropical islands of the Indo-Pacific, has a range of about 180° of longitude, from the islands in the vicinity of Madagascar on the west, to the Sandwich Is. and Paumatu (Low) Archipelago on the east.

Birgus, like the Coenobites, is a fruit-eating—but, on occasion, carnivorous (scavenging) and cannabalistic—" land-crab," and is a denizen of the jungle, though it is said to visit the shore, and the females must periodically seek the sea to hatch-off their eggs.

It is essentially a Paguroid (and a Coenobite), being singular only in its gigantic size and in its habits. Its size is such as to render a portable habitation an inconvenience, if not an impossibility, and the requisite protection for its abdomen is supplied by a re-development of the terga, the first five of which are as perfect as those of *Pylocheles*. Again, by reason of its being an air-breather, its gills, like those of *Coenobita*, are of only subsidiary importance, and respiration is effected—and herein lies the chief difference, consequent on a more finished adaptation to a perfectly independent life on land, between *Birgus* and *Coenobita*—by an enormous development not only of the gill-chambers themselves, but also of their lining membrane.

The habits of this remarkable hermit-crab have attracted the attention of many travellers, from the time of Master Francis Fletcher, the chaplain

and historian of Drake's famous voyage of circumnavigation, up to the present day. In *Willey's Zoological Results*, part V., p. 590, Mr. L. A. Borradaile has given a list of the principal observations that have been published.

It is to Willey and Borradaile also that we owe the knowledge that the young of *Birgus* leaves the egg as an (aquatic) zoæa resembling other known Pagurine zoæas.

1. Birgus latro, L. Plate XVI.

Cancer crumenatus, Rumph, Amboinsch. Rariteitk., 1705, p. 7, pl. iv.

Cancer crumenatus orientalis, Seba., Thesaur., III., 1761, pl. xxi. fig. 1. 2.

Cancer latro, Linn., Syst. Nat. (ed. 12) II., 1767, p. 1049: Herbst, Krabben, II., ii., 1791, p. 34, pl. xxiv.

Pagurus latro, Fabr., Ent. Syst. Suppl., 1798, p. 411: Bosc. Hist. Nat. Crust., II., 1802, p. 76: Latreille, Hist. Nat. Crust., VI., 1803, p. 164: Olivier, Encycl. Méthod VIII., 1811, p. 639: Lamarck, Hist. Anim. sans Vert., V., 1818, p. 221: Quoy & Gaimard, Voy. Uranie, 1824, p. 534, pl. lxxx.

Birgus latro, Leach, Trans. Linn. Soc., XI., 1815, p. 337: Desmarest, Dict. Sci. Nat., XXVIII., 1823, p. 289; and Consid. Gen. Crust., 1825, p. 180, pl. xxx. fig. 3: Guérin, Icon. R. A. (2 ed.) Crust., pl. xvi. fig. 1; Owen, P. Z. S., 1832, p. 17: Milne Edwards, Hist. Nat. Crust., II., 1837, p. 246; and in Cuvier, R. A. (3 ed.) Crust., pl. xliii. fig. 1: De Haan, Faun. Japon. Crust., 1849, p. 212: Dana, U. S. Expl. Exp., Crust., pt. I., 1852, p. 474, pl. xxx. fig. 5: Hilgendorf in v. d. Decken's Reisen Ost-Afr., III. i. 1869, p. 100: Brocchi, Ann. Sci. Nat., Zool. (6) II., 1875, Art. 2, p. 39, pl. xv. fig. 44 (male orifice): Suhm, Zeits. wiss. Zool., XXVI., 1875, p. 73: Streets, Bull. U. S. Nat. Mus., VII., 1877, p. 118: Semper, Zeits. wiss. Zool., XXX., 1878, p. 282: Grube JB. Schles. Ges., 1878, p. 76: Guppy, P. L. S., N. S. Wales, VII., 1882, p. 661: Lucas, Ann. Soc. Ent. France (6) III., 1883 (2e part), p. xxxix: Miers, Zool. "Alert," 1884, p. 555: Bourne, P. Z. S., 1886, p. 333: Henderson, Challenger Anomura, 1888, p. 50: de Man, Arch. f. Nat., LIII., i. (1887), 1888, p. 453; and Abh. Senckenb. Ges., 1902, p. 751: Ortmann, Zool. Jahrb., Syst., 1891-92, p. 319; and in Bronn's Thier Reich, Malacostraca, p. 1235: T. R. R. Stebbing, Hist. Crust., 1893 p. 156: Whitelegge, Mem. Austral. Mus., III., 1897, p. 140: Borradaile, P. Z. S., 1898, p. 458; and 1899, p. 937; and Stomatop. and Macrura of Willey's Exp., 1899, pp. 397, 426; and 1900, pp. 585-590 (*ubi lit.*): Andrews, Monograph of Christmas I., 1900, p. 164: Nobili, Ann. Mus. Genov. (2) XX., 1899, pp. 248, 496.

Birgus laticauda (Latreille) Desmarest, Dict. Sci. Nat., XXVIII., 1823, p. 290: and Consid. Gén. Crust., 1825, p. 180 (*Pagurus laticauda*, Latreille, Cuvier R. A., IV., pl. 12, fig. 2).

Carapace transversely scored and rugose with the edges of the ridges burred with very short bristles. Rostrum stout, acute, often surpassing the eyes.

Eyestalks not, or little, surpassing the penultimate joint of the antennal peduncle: the latter peduncle not very much longer than the basal joint of the antennular peduncle.

Chelipeds and 2nd—4th legs rugose, the rugæ of the carpi and propodi being fringed with short bristles and with dark-coloured corneous granules and denticles: on the fingers of the chelipeds and 4th pair of legs, and on the stout dactyli of the 2nd and 3rd pair of legs, the black corneous tubercles are very numerous and are often spiniform or squamiform.

Usually the legs of the two sides are symmetrical, those of the 2nd pair being the longest and exceeding those of the 3rd pair by the dactylus and the larger cheliped by about half the dactylus; but sometimes in the female the 2nd left leg is shortened and the 3rd right leg lengthened. The coxæ of the 5th legs are not produced to any special extent.

Colours of fresh spirit specimens: exposed dorsal surface of body and appendages rich tortoise-shell, ventral surface bluish-purple. In old spirit specimens the colours fade a good deal.

The adult male is much larger than the female. In the largest male of the Museum collection the carapace measures 187 millim. (about $7\frac{3}{8}$ inches) in extreme length and the same across the branchial regions.

$\frac{2953\cdot4}{3}$: $\frac{4756\cdot58}{10}$: $\frac{4753\cdot54}{10}$.	S. Sentinel I., Andamans.	T. Cadell, V. C.
$\frac{4750}{10}$: $\frac{4752}{10}$.		"Investigator."
$\frac{4645}{10}$.		C. G. Rogers.
$\frac{4749}{10}$	Bantam, Java	H. O. Forbes.
$\frac{4751}{10}$.	Flinders I., Bass Str.	F. W. Hutton.

Geographical distribution: from the Comoro Islands (off the coast of Mozambique), Madagascar, Réunion, Mauritius, Seychelles and Chagos Is. (Diego Garcia), to the Andamans (S. Sentinel I.) and Nicobars, then through the East Indian Archipelago to the Liu Kiu Is., and through Polynesia to the Paumatu Archipelago, Fanning, and Sandwich Is.

Within the limits of British India *Birgus latro* is known to occur only in the Nicobars, and at S. Sentinel I., a western outlier of the Andaman group. In 1889 it was very abundant at S. Sentinel, where the officers of the "Investigator" observed it crouching under fallen trunks and between the buttress-roots of large trees during the heat of the day, but becoming active at times of cloud and rain, and towards nightfall Individuals carried away captive were noticed to be nocturnal and cannabalistic, and one was seen deliberately drinking rainwater. The creature though powerful is sluggish and unaggressive, and uses its long 2nd pair of legs rather than its nippers in offence.

TABLE OF THE GENERA AND SPECIES OF PAGURIDES.

The names of the Indian genera and species are printed in small capitals.

PAGURIDEA.

Family PYLOCHELIDÆ.

Pomatockeles, Miers	Proc. Zool. Soc., 1879, p. 49.	
,, *jeffreysi*, Miers.	*l. c.*, pl. iii. fig. 2.	Corean and Japanese Seas, 48—58 fathoms.
PYLOCHELES, A. Milne Edwards.	*Ante.*	
,, *agassizii*, A. Milne Edwards.	Bull. Mus. Comp. Zool., VIII., 1880, p. 38: A. Milne Edwards & Bouvier, Mem. Mus. Comp. Zool., XIV., No. 3, p. 20, 1893.	West Indian Seas (Barbadoes, Sta Cruz, St. Lucia) 154—200 fath.
,, *partitus*, Benedict.	Benedict, Proc. U. S. Nat. Mus., 1901, p. 775, fig. 5, 6.	G. of Mexico, 211 fathoms.
,, MIERSII, Alcock & Anderson.	*Ante.*	Andaman Sea, 185 fath.
CHIROPLATÆA, Spence Bate.	*Ante.*	
,, *cenobita*, Spence Bate.	Challenger Crustacea Macrura, 1888, p. 12, pl. i. fig. 1.	Banda Sea, 200 fath.
,, *scutata*, Ortmann.	Zool. Jahrb., Syst., VI., 1892, p. 275, pl. xii. fig. 4.	G. of Mexico.
,, MACGILCHRISTI, Alcock.	*Ante.*	
Mixtopagurus, A. Milne Edwards.	Bull. Mus. Comp. Zool., VIII., 1880, p. 39: A. Milne Edwards and Bouvier, Mem. Mus. Comp. Zool., XIV., No. 3, p. 23, 1893.	
paradoxus, A. Milne Edwards.	Bull. Mus. Comp. Zool. *l.c.*: Mem. Mus. Comp. Zool. *l. c.*, pl. ii.	West Indian Seas (Barbadoes, Guadaloupe), 175—200 fath.
gilli Benedict.	Benedict, Proc. U. S. Nat. Mus., 1901, p. 777, fig. 7.	Off coast N. Carolina, 107 fath.
spinosus, Henderson.	*Pylocheles spinosus*, Henderson, Challenger Anomura, p. 101, pl. xi. fig. 1, 1888.	Off Twofold B., Australia, 150 fath.

PARAPYLOCHELES Alcock.	*Ante.*	
„ SCORPIO, Alcock.	*Ante.*	Andaman S., 405 fath.

Family PAGURIDÆ.

GLAUCOTHOE, Edwards.	*Ante.*	
„ *peronii*, Edwards.	Milne Edwards, Ann. Sci. Nat. Zool., XIX., 1830, p. 334; and Hist. Nat. Crust., II., 307; and in Cuvier, R. A. (ed. 3), pl. xliii. fig. 2; Bouvier, Ann. Sci. Nat. Zool. (7) XII., 1891, p. 79; Milne Edwards & Bouvier, Crust. Decap. Travailleur et Talisman, pt. I. 1900, p. 260, pl. xxvii. fig. 11—17.	"Seas of Asia:" Eastern N. Atlantic, 504—666 fath.
„ SP. PROX. PERONII.	*Ante.*	Arabian S., 719 fath.
„ *vostrata*, Miers.	Miers, P.Z.S., 1881, p. 62, pl. vii. fig. 1—5: Bouvier, Ann. Sci. Nat. Zool. (7) XII., 1891, p. 80.	Madeira, 15—59 fath.
„ *carinata*, Henderson.	Henderson, Challenger Anomura, 1888, p. 84, pl. ix. fig 1: Bouvier, Ann. Sci. Nat. Zool. (7) XII., 1891, p. 80: Chevreux & Bouvier, Mem. Soc. Zool. France, V., 1892, p. 138, pl. iv. fig. 12—24: Ortmann, Zool. Jahrb., Syst., VI., 1891-92, p. 276 · Milne Edwards & Bouvier, Crust. Decap. Travailleur et Talisman, pt. I. 1900, p. 263; Whitelegge, Mem. Austral. Mus., IV., pt. 2, 1900, p. 179.	Coast of N. S. Wales, 24—120 fath.; Japan, 100 fath.; African N. Atlantic, 3—76 fath.
„ *hexagonata*, Whitelegge.	Whitelegge, Mem. Austral. Mus., IV., pt. 2, 1900, p. 177, fig. 12, 12a.	Coast N. S. Wales, 54—59 fath.

Sub-family PAGURINÆ.

PAGUROPSIS, Henderson.	*Ante.*	
„ TYPICA, Henderson.	*Ante.*	Oriental sublittoral, 90—115 fath.
PAGURISTES, Dana.	*Ante.*	
„ LONGIROSTRIS, Dana.	*Ante.*	B. of Bengal, 7—28 fath. Singapore.
„ BALANOPHILUS.	*Ante.*	Arabian S., B. of Bengal, 53—60 fath.
„ CALVUS.	*Ante.*	B. of Bengal, 65 fath.

PAGURISTES MUNDUS.	*Ante.*	Andaman S., 112 fath.
,, PUSILLUS, Henderson.	*Ante.*	B. of Bengal, 28 fath.
,, CILIATUS, Heller.	*Ante.*	Nicobars : Persian Gulf, 48—49 fath.
,, PUNICEUS, Henderson.	*Ante.*	Arabian S., B. of Bengal, Andaman S., 133—419 fath.
,, HIANS, Henderson.	*Ante.*	Indian coasts : Philippines, 18—28 fath.
,, INCOMITATUS.	*Ante.*	Arabian S., 100 fath.
,, *jousseaumei*, Bouvier.	Bouvier, Bull. Soc. Philomath. (8) IV., 1891-92, p. 52.	Red S., Aden.
,, *gonagrus*, Edwards.	Milne Edwards, Ann. Sci. Nat. Zool. (2) VI., 1836, p. 281, and Hist. Nat. Crust., II, 233.	China S.
,, *brevicornis*, Guérin.	Milne Edwards, Ann. Sci. Nat. Zool. (3) X., 1848, p. 64.	(?)
,, *kukenthali*, de Man.	de Man, Abh. Senckenberg. Nat. Ges., XXV., 1902, p. 733, pl. xxiv. fig. 43.	Moluccas.
,, *digitalis*, Stimpson.	Stimpson, Proc. Ac. Nat. Sci. Philad. (1858), 1859, p. 247.	Japan (41°49′ N.)
,, *seminudus*, Stimpson.	Stimpson, *loc. cit. supra.*	Japan.
,, *barbatus*, Ortmann.	Ortmann, Zool. Jahrb. Syst., VI., 1892, p. 279; (Stead, Zoologist, 1898, p. 208.)	Japan up to 100 fath. (Port Jackson ? N. Zealand?)
,, *acanthomerus*, Ortmann.	Ortmann, *loc. cit. supra.*	Japan, 70—80 fath.
,, *palythophilus*, Ortmann.	Ortmann, *tom. cit.*, p. 277.	Japan, 70—100 fath.
,, *kagoshimensis*, Ortmann.	Ortmann, *tom. cit.*, p. 281.	Japan, 35—40 fath.
,, *frontalis*, Edwards.	Milne Edwards, Ann. Sci. Nat. Zool. (2) VI., 1836, p. 283, pl. xiii. fig. 3, and Hist. Nat. Crust., II, 234 : *Eupagurus frontalis*, Haswell, Cat. Austral. Crust., p. 154.	Australia.

PAGURISTES *tuberculatus* Whitelegge.	Whitelegge, Mem. Austral. Mus., IV., pt. 2, 1900, p. 169, fig. 11, 11*a*.	N. S. Wales, 22—27 fath.
,, *pilosus*, Edwards.	Milne Edwards, Ann. Sci. Nat. Zool. (2) VI., 1836, p. 282, pl. xiv. fig. 1. and Hist. Nat. Crust., 1837, p. 233: Miers, Cat Crust. N. Z., p. 66: Filhol in Miss. l'ile Campbell, III. ii. l. p. 424; Henderson, Challenger Anomura, p. 77: Thomson, Trans. N. Z. Inst., 1898, p. 187.	New Zealand.
,, *subpilosus*, Henderson.	Henderson, Challenger Anomura, p. 77: Thomson, Tr. N. Z. Inst., 1898, p. 187.	New Zealand, 150 fath.
,, *setosus*, Edwards.	Milne Edwards, Ann. Sci. Nat. Zool. (3) X., 1848, p. 64 (?Filhol, *l. c.* p. 490, pl. xlix): Ortmann, Zool. Jahrb., Syst., VI., 1892, p. 281, pl. xii. fig. 9.	N. Guinea; N. Zealand; Japan, 100 fath.
,, *turgidus*, Stimpson.	Stimpson, Ann. Lyc. Nat. Hist., N. York, VII., 1862, p. 86 (Journ. Boston Soc. Nat. Hist., VI., 1857, p. 484, pl. xxi. fig. 1). See Holmes, Occas. Papers Calif. Acad. Sci., 1900, p. 151.	Pacific coast, N. America (47°30′ N.)
,, *digueti*, Bouvier.	Bouvier, Bull. Soc. Philom. Paris (8) V., 1892-93, p. 18.	Lr. California, 12—25 fath.
,, *perrieri*, Bouv.	Bouvier, Bull. Mus. d'Hist. Nat. Paris, I., 1895, p. 7.	Lr. California.
,, *parvus*, Holmes.	Holmes, Occas. Papers Calif. Acad. Sci., 1900, p. 151.	California.
,, *bakeri*, Holmes.	Holmes, Occas. Papers Calif. Acad. Sci., 1900, p. 152.	California.
,, *fecundus*, Faxon.	Faxon, Bull. Mus. Comp. Zool. Harvard, XXIV., 1893, p. 173; and Mem. Mus. Comp. Zool. Harvard, XVIII., 15, 1895, p. 66, pl. xiv. fig. 2-2e.	Off Pacific coast of Central America, 66 fms.
,, *weddellii*, Edwards.	Milne Edwards, Ann. Sci. Nat. Zool. (3) X., 1848, p. 64. See Kinahan, Journ. Roy. Soc. Dublin, 1858, p. 350.	Peru.
,, *hirtus*, Dana.	Dana, U. S. Expl. Exp., Crust., pt. I., p. 437, pl. xxviii. fig. 2 *a-f*: Lenz, Zool. Jahrb. Suppl.-Bd. V. ii., 1902, p. 740. See Kinahan, Journ. Roy. Soc. Dublin, 1858 p. 350.	Peru (41°10′ S.)
,, *tomentosus*, Edwards.	Milne Edwards, Ann. Sci. Nat. Zool. (3) X., 1848, p. 64: Kinahan, Journ. Roy. Soc. Dublin, 1858, p. 351.	Peru.
,, *depressus*, Stimpson.	Stimpson, Ann. Lyc. Nat. Hist., N. York, VII., 1862, p. 87: Benedict, Bull. U. S. Fish. Comm., XX (2), p. 144, pl. iv. fig. 5.	West Indies, 2 fath.
,, *planatus*, Edw. & Bouv.	Milne Edwards and Bouvier, Mem. Mus. Comp. Zool. Harvard, XIV, No. 3, 1893, p. 43, pl. iv. fig. 1—5.	West Indies, 100 fath.

PAGURISTES *sericeus*, Edwards.	Milne Edwards, Bull. Mus. Comp. Zool. Harvard, VIII., 1880, p. 44: Milne Edwards and Bouvier, *tom. cit.*, p. 46, pl. iii. fig. 14—22.	West Indies, 36 fath.
,, *spinipes*, Edwards.	Milne Edwards, Bull. Mus. Comp. Zool., Harvard, VIII. 1880, p. 44: Milne Edwards and Bouvier, *tom. cit.*, p. 33, pl. iii, fig. 1—13. (=*P. visor*, Henderson. Challenger Anomura, 1888, p. 78, pl. viii. fig 3). Benedict, Bull, U. S. Fish. Comm., XX (2), p. 145, pl. iv. fig. 6	W. Indies, 92—191 fath. (Off Pernambuco, 350 fath.)
,, *lymani*, Edw. & Bouv.	Milne Edwards and Bouvier, Bull. Soc. Philom., Paris, (8) III.. 1890-91, p. 108; and Mem. Mus. Comp. Zool. Harvard, XIV, No. 3, 1893, p. 49, pl. iv. fig. 13—22 Benedict. Bull. U. S. Fish. Comm. XX (2), p. 146, pl. iv. fig. 8.	W. Indies, 15—878 fath.
,, *triangulatus*, Edw. & Bouv.	Milne Edwards and Bouvier, Mem. Mus. Comp. Zool., *tom. cit* p. 40, pl. iv. fig. 6—12: Benedict, Bull. U. S. Fish Comm., XX (2), p. 146 pl. iv fig. 9.	W. Indies, 73—82 fath.
,, *sayi*, Edw. & Bouv.	Milne Edwards and Bouvier, Mem. Mus. Comp. Zool., *tom. cit.*, p. 55: Benedict, Bull. U. S. Fish. Comm. XX (2), p. 144, pl. iv. fig. 2.	W. Indies, 82—288 fath.
,, *tenuirostris*, Benedict.	Benedict, Bull. U. S. Fish. Comm., XX (2), p. 143, pl. iv. fig. 1.	G. of Mexico.
,, *moorei*, Benedict.	Benedict, *tom. cit.*, p. 144, pl. iv. fig. 3.	Porto Rico.
,, *puncticeps*, Benedict.	Benedict, *tom. cit.*, p. 144, pl. iv. fig 4.	Jamaica.
,, *rectifrons*, Benedict.	Benedict, *tom. cit.*, p. 145, pl. iv. fig. 7.	Porto Rico.
,, *grayi*, Benedict.	Benedict, *tom. cit.*, p. 146, pl. v. fig. 1, 1*a*	Porto Rico.
,, *visor*, Henderson.	Henderson, Challenger Anomura, 1888, p. 78, pl. viii. fig. 3. (See above, *P. spinipes*, A. M. Edw.)	Off Pernambuco, 350 fath.
,, *marocanus*, Edw. & Bouv.	Milne Edwards and Bouvier, Ann. Sci. Nat. Zool., XIII., 1892, p. 207, and Crust. Décap. Travailleur et Talisman, pt. I., 1900, p. 167, pl. xxiii. fig. 1—6.	Off N. W. coast of Africa, 70—156 fath.
,, *hispidus*, Edw. & Bouv.	Milne Edwards and Bouvier, Ann. Sci. Nat. *tom. cit.*, p. 208, and Crust. Decap. Trav. et Talism., p. 170, pl. xxiii. fig. 7—10.	Off W. coast of Africa.
,, *gamianus*, Edwards.	Ann. Sci. Nat., Zool., 1836, p. 283, and Hist. Nat. Crust., II., 235: Krauss, Sudafr. Crust., p. 57.	C. of Good Hope (about 34°S.)

PAGURISTES *oculatus*, Fabr.	*Pagurus oculatus*, Fabricius, Ent. Syst., II, 1793, p. 471, and Suppl. p. 413 : Herbst, Krabben, II. i. 1796, p. 24, pl. xxiii. fig. 4 : (Bosc, Latreille, Olivier, Risso, Desmarest). Picquenard, Bull. Soc. Sci. Med. de l'Ouest, Rennes, IV., 1895, p. 57. *Pagurus maculatus*, Risso, Hist. Nat. Eur. Mérid., V., 1826, p. 39 : Roux, Crust. Médit., pl. xxiv. fig. 1—5 : Milne Edwards, Ann. Sci. Nat., Zool., 1836, p. 281, and Hist. Nat. Crust., II., 231 : Lucas, Hist. Nat. Anim. Art. in Expl. Sci. Algerie, Zool., pt. I., p. 29 : Brocchi, Ann. Sci., Nat. Zool. (6) II., 1875, Art. 2, p. 39. *Paguristes maculatus*, Heller, Crust. sudl. Europ., p. 172, pl. v. fig. 15 : Nardo, Annot. Crost. Adriat. p. 95 : Carus, Prodr. Faun. Médit., I., p. 494 : Ortmann, Zool. Jahrb., Syst., VI., 1892, p. 277 : Chevreux and Bouvier, Mem. Soc. Zool. de France, 1892, p. 87 (*ubi synon.*).	Mediterranean S., Spanish coast off C. Finisterre, down to about 100 fathoms.
,, *oculatus* var. *brunneo-pictus*, E. & B.	Milne Edwards and Bouv., Crust. Décap. Travailleur et Talisman, pt. I., 1900., p. 165, pl. vi. fig. 1. (Ann. Sci. Nat. Zool. (7) XIII., 1892, p. 206).	N. W. coast Africa, 54—82 fath.
CLIBANARIUS, Dana.	*Ante.*	
,, CLIBANARIUS, Dana.	*Ante.*	W. & S.-E. Africa to Hongkong.
,, INFRASPINATUS, Hilgdf.	*Ante.*	Red Sea to Sydney.
,, *japonicus*, Rathbun.	Mary Rathbun, Proc. U. S. Nat. Mus., 1903, p. 35, fig. 2—5.	Japan.
,, *taeniatus*, Edwards.	*Pagurus clibanarius*, Quoy et Gaimard, Voy. Uranie, p. 529, pl. lxxviii. fig. 1, 1824 : *Pagurus taeniatus*, Milne Edwards, Ann. Sci. Nat. Zool. (3) X., 1848, p. 63 : *Clibanarius taeniatus*, Miers, Zool. Alert., p. 265 : de Man, Notes Leyden Mus., XII., 1890, p. 113.	N.-E. & W. Australia.
,, LONGITARSIS, De H.	*Pagurus longitarsus*, De Haan, Faun. Japon. Crust., 1849, p. 211, pl. l. fig. 3 : *Clibanarius longitarsis*, Dana, U. S. Expl. Exp. Crust., pt. I., 1852, p. 464 : Stimpson, Proc. Ac. Philad. (1858), 1859, p. 247 : Heller, Novara Crust., p. 90 : Hilgendorf, in v. d. Decken's Reisen Ost-Afr., III. i. p. 96 ; and MB. Ak. Berl., 1878, p. 821 : Lenz u. Richters, Abh. Senck. Ges., XII., 1881, p. 426 : de Man, Arch. f. Nat., LIII., 1887, i., p. 441 ; and in Weber's Zool. Ergebn. Niederl. Ost-Ind., II., 1892, p. 352 ; Ortmann in Semon's Zool. Forschungsr. Crust., p. 31 : Nobili, Ann. Mus. Genov. (2) XX. 1900, p. 492 ; and Boll. Mus. Torino, 1903, No. 452, p. 15, No. 455, p. 20 : Lanchester, P.Z.S., 1902, II., p. 365.	Zanzibar & Madagascar to Liu Kiu Is.

CLIBANARIUS, PADAVENSIS, de Man.	*Ante.*	S. India to Singapore.
„ STRIOLATUS, Dana.	*Ante.*	G. of Aden to Tahiti.
„ *lineatus*, Edwards.	*Pagurus lineatus*, Milne Edwards, Ann. Sci. Nat. Zool. (3) X., 1848, p. 62. *Clibanarius lineatus*, Dana, U. S. Expl. Exp., Crust., pt. I., p. 462, pl. xxix. fig. 2.	Samoa.
„ *asper*, Edwards.	*Pagurus asper*, Edw., Ann. Sci. Nat. Zool. (3) X., 1848, p. 62.	"Indian Seas."
„ *eurystemus*, Hilgdf.	Hilgendorf, MB. Ak. Berlin, 1878, p. 822, pl. iii. fig. 9, 10: de Man, Arch. f. Nat., LIII., 1887, i. p. 447: Nobili, Ann. Mus. Genov. (2) XX., 1900, p. 493.	Mozambique: Malay Arch.
„ CORALLINUS, Edwards.	*Ante.*	Andamans to Tahiti.
„ *carnifex*, Heller.	Heller, Verh. zool. bot. Ges. Wien, 1861, p. 23, and SB Akad. Wien, XLIV., 1861, p. 250: Kossmann, Reise roth. Meer. Malacost., p. 78: Bouvier, Bull. Soc. Philom. (8) IV., 1891-92, p. 53.	Red Sea.
„ ARETHUSA, de Man.	*Ante.*	B. of Bengal.
„ CRUENTATUS, Edwards.	*Ante.*	Mergui; New Zealand; Funafuti.
„ AEQUABILIS, Dana.	*Ante.*	Madeira eastwards to California & Chili.
„ *pacificus*, Stimps.	Stimpson, Proc. Ac. Nat. Sci., Philad. (1858), 1859, p. 247.	Japan.
„ HUMILIS, Dana.	*Ante.*	Laccadives to W. Pacific.
„ *zebra*, Dana.	Dana, U. S. Expl. Exp. Crust., pt. I., 1852, p. 465, pl. xxix. fig. 5 *a—d*: Borradaile, P.Z.S., 1898, p. 463.	Sandwich Is.; Funafuti.
„ *virescens*, Krauss.	*Pagurus virescens*, Krauss, Sudafr. Crust., 1843, p. 56, pl. iv. fig. 3. *Clibanarius virescens*, Dana, U. S. Expl. Exp. Crust., pt. I, 1852, p. 466, pl. xxix. fig. 6 *a—b*; Heller, Novara Crust., p. 90: Hilgendorf in v. d. Decken's Reisen Ost-Afr., III. i. p. 95, and MB. Ak. Berlin. 1878, p. 821, pl. iii, fig. 11: Ozorio, Journ. Sci. Nat. Lisb., XI., 1887, p. 228: Bouvier, Bull. Soc. Philom. (8) IV., 1891-2, p. 54: Ortmann, in Semon's Forschungsr. Crust., p. 31: Whitelegge, Mem. Austral. Mus., III., 1897, p. 143.	W. & S.-E. Africa to Fiji.

CLIBANARIUS *signatus*, Heller.	Heller, Verh. zool. bot. Ges. Wien., 1861, p. 23, and SB. Ak. Wien, XLIV., 1861, p. 252: Kossman, Reise roth. Meer. Malacost, p. 78: Bouvier, Bull. Soc. Philom. (8) IV., 1891-92, p. 53.	Red Sea.
,, *bimaculatus*, De H.	*Pagurus bimaculatus*, De Haan, Faun. Japon., Crust. 1849, p. 210. pl. l. fig. 4: *Clibanarius bimaculatus*, Ortmann, Zool. Jahrb., Syst., VI., 1892, p. 291.	Japan.
,, *strigimanus*, White.	*Pagurus strigimanus*, White, P. Z. S. 1847, p. 121. *Clibanarius strigimanus*, Miers, Zool. Erebus and Terror, Crust., p. 3, pl. ii. fig. 4: Henderson, Challenger Anomura, p. 60: Whitelegge, Mem. Austral. Mus., IV., pt. 2, 1900, p. 167.	Tasmania and S.-E. coast Australia, to 50 fath.
,, ALBICINCTUS, Alc.	*Ante.*	Off C. Comorin, 102 fath.
,, *barbatus*, Heller.	Heller, Verh. zool. bot Ges. Wien, 1862, p. 524, and Novara Crust., p. 90, pl. vii. fig. 5: Miers, Cat. Crust., N. Z., p. 67: Filhol, Crust. N. Z. in Miss. l'ile Campbell, p. 425: Thomson, Tr. N. Z. Inst., 1898, p. 172.	New Zealand.
,, *panamensis*, Stimpson.	Stimpson, Ann. Lyc. Nat. Hist., N. York, VII., 1862, p. 84: Bouvier, Bull. Soc. Philom. (8) V, 1892-3. p. 24.	Panama, Lr. California.
,, *lordi*, Miers.	Miers, P. Z. S., 1877, p. 658, pl. lxvi. fig. 4.	Vancouver I.
,, *magnificus*, Bouvier.	Bouvier, Bull. Mus. d'Hist. Nat. Paris, 1898, p. 378.	Lr. California.
,, *digueti*, Bouvier.	Bouvier, Bull. Mus. d'Hist. Nat. Paris, 1898, p. 379.	Lr. California.
,, *albidigitus*, Nobili.	Nobili, Boll. Mus. Torino, XVI., 1901, No. 415, pp. 24, 26.	Ecuador.
,, *sclopetarius*, Herbst.	*Cancer sclopetarius*, Herbst, Krabben, II., 1796, p. 23, pl. xxiii. fig. 3: (*Pagurus sclopetarius*, Bosc, Latreille, Olivier): *Clibanarius sclopetarius*, Stimpson, Ann. Lyc. Nat. Hist. N. Y. VII., 1862, p. 85: Nobili, Boll. Mus. Torino, XII., 1897, No. 280, p. 4: Mary Rathbun, Ann. Inst. Jamaica, I., 1897, p. 43; Moreira, Archiv Mus. Rio Janeiro, 1901, p. 27: Benedict, Bull. U. S. Fish. Comm., XX (2), p. 142.	Florida Keys to Brazil.
,, *cubensis*, Sauss.	Saussure, Mem Hist. Nat. Mexique, Crust., p. 39: Martens, Arch. f. Nat., XXXVIII., 1872, i., p. 117 (=*C. sclopetarius*, Hbst. *fide* Stimpson).	Cuba.
,, *vittatus*, Bosc.	*Pagurus vittatus*, Bosc, Hist. Nat. Crust., II., p. 78, pl. xii. fig. 1: (Latreille, Olivier, Desmarest). Gibbes, Proc. Am. Ass. Adv. Sci., III., 1850, p. 189. *Clibanarius vittatus*, Stimpson, 1859, Kingsley, Proc. Ac Nat. Sci. Philad., 1878, p. 326. Moreira, Archiv Mus. Rio Janeiro, 1901, p. 28.	North Carolina to Brazil.

CLIBANARIUS *cayennensis*, Miers.	Miers, P. Z. S., 1877, p. 657, pl. lxvi. fig. 1.	Cayenne.
„ *carnescens*, Miers.	Miers, P. Z. S., 1877, p. 658, pl. lxvi. fig. 2.	Cayenne.
„ *speciosus*, Miers.	Miers, P. Z. S. 1877, p. 658, pl. lxvi. fig. 3: Ortmann, Zool. Jahrb., Syst., VI., 1892, p. 290; Doflein SB. Ak. Munchen, 1900, p. 134; Moreira, Arch Mus. Rio Janeiro, 1901 p. 29.	Brazil.
„ *formosus*, Ives.	Ives, Proc. Ac. Nat. Sci., Philad., 1891, p. 182, pl. v. fig. 1, 2.	W. Indian region.
„ *tricolor*, Gibbes.	*Pagurus tricolor*, Gibbes, Proc Am. Ass., 1850, p. 189: *Clibanarius tricolor*, Rankin, Ann. N. Y. Acad. Sci., 1900, p 535: Benedict Bull. U. S. Fish Comm., XX. 2, p. 142, pl. vi. fig. 2.	Florida, West Indies.
antillensis, Stimps.	Stimpson, Ann. Lyc. Nat. Hist., N. York, 1862, p. 85: Nobili Boll. Mus. Torino, 1897 No. 280, p 4: Moreira, Arch. Mus. Rio Janeiro, 1901, p. 29: Benedict, Bull. U. S. Fish. Comm., XX. 2, p. 142, pl. vi. fig. 1.	West Indies, Brazil.
„ *brasiliensis*, Dana.	Dana, U. S. Expl. Exp., Crust., pt. I., 1852, p. 467, pl. xxix. fig. 7.	Brazil.
„ *anomalus*, Edw. and Bouv.	Milne Edwards and Bouvier, Bull. Soc. Philom. (8) III 1890-91, p. 108; and Mem. Mus. Comp. Zool. Harvard, XIV., No. 3, 1893, p. 157, pl. xi. fig. 13—23.	West Indies, 73—163 fath.
„ *verrilli*, Rathb.	Mary Rathbun, Amer. Journ. Sci. (4) XI., 1901, p. 328 footnote: Verrill Trans. Conn. Acad., XI., 1901-1903 p. 18, pl. viii. fig. 2-3.	Bermudas.
„ *africanus*, Auriv.	Aurivillius, Bihang Svensk. Vetensk. Akad. Handl. XXIV. iv. No. 1, 1898, p. 12, pl. iv, fig. 7.	W. Africa.
„ *cooki*, Rathb.	Mary Rathbun, Proc. U. S. Nat. Mus. 1900, p. 305.	W. Africa.
„ *senegalensis*, C. & B.	Chevreux and Bouvier, Bull. Soc. Zool. France, 1891, p. 256, and Mem. Soc. Zool. France, 1892, p. 131, pl. iv. fig. 7-11.	W. Africa.
„ *melitai*, C. & B.	Chevreux and Bouvier, Bull. Soc. Zool. France, 1891, p. 255, and Mem. Soc. Zool. France, 1892, p. 135, pl. iv. fig. 1-6.	W. Africa.

CLIBANARIUS *misanthropus*, Risso.	*Pagurus tubularis*, Fabr., Risso Crust. Nice, 1816, p. 56. *Pagurus labillardieri*, Savigny Descr. de l'Egypte, 1817, pl. ix. fig. 2 (Audouin, Explic. Sommaire, p. 90). *Pagurus misanthropus*, Risso, Hist. Nat. Europ. mérid. v. 1826, p. 40: Roux, Crust. Médit. 1828, pl. xiv. fig. 1, 2: Milne Edwards, Hist. Nat Crust. II. p. 228. *Pagurus nigritarsis*, Lucas, Expl. Sci. Algerie, Zool. 1849 Crust., p. 30, pl. iii. fig. 4. *Pagurus oculatus*, Edw. (nec. Fabr.) Hist. Nat. Crust. II. 1837, p. 226 (*fide* Bouvier, Feuille des Jeunes Naturalistes, 1896, p. 9). *Clibanarius misanthropus*, Heller, Crust. Sudl. Europ., 1863, p. 177, pl. v. fig. 16-18: Hesse, Ann. Sci. Nat., Zool., (6) III. 1876, No. 25, pp. 1-29: Miers, P.Z.S., 1877, p. 673: Ortmann, Zool. Jahrb., Syst., VI. 1892, p. 291: Carus, Prodr. Faun. Medit. I. p. 495; Milne Edwards and Bouvier, Crust. Décap. Hirondelle, pt. I. Monaco 1894, p. 77.	Azores & Mediterranean.
,, *rouxi*, Heller.	Heller. Crust. sudl. Europ., p. 179; Carus, Prodr. Faun. Medit. I. p. 495.	Mediterranean.
,, *hirsutus*, Costa	Carus, Prodr. Faun. Medit. I. p. 496.	Mediterranean.

Doubtful species of Clibanarius:—

,, *crassimanus*, Edw.	*Pagurus crassimanus*, Milne Edwards, Ann. Sci. Nat., Zool., (2) VI. 1836, p. 277, and (3) X. 1848, p. 62; and Hist. Nat. Crust. II., p. 227.	"South Sea."
, *aculeatus*, Edw.	*Pagurus aculeatus*, Milne Edwards, Ann. Sci. Nat. Zool. (3) X. 1848, p. 62.	S. coast Australia.
,, *tuberculosus*, Edw.	*Pagurus tuberculosus*, Milne Edwards, Ann. Sci. Nat., Zool., (2) VI. 1836, p. 278, pl. xiii. fig. 1; and Hist. Nat. Crust. II. 229.	West Indies.
,, *elongatus*, Edw.	*Pagurus elongatus*, Milne Edwards, Ann. Sci. Nat., Zool., (3) X. 1848, p 62.	Hogolu, Caroline, Is.
,, *annulipes*, Edw.	*Pagurus annulipes*, Milne Edwards, Ann. Sci. Nat., Zool., (3) X. 1848, p. 63.	New Guinea.

Clibanarius mediterraneus Kossman (Arch. f. Nat, XLIV, 1878, i. p. 257; and Carus Prodr, Fauna Medit. I. p. 495) is according to Bouvier (Bull. Mus. Philom. Paris, (8) II., 1889-90, p. 122), synonymous with EUPAGURUS ANACHORETUS Risso.

ISOCHELES.

Isocheles seems to differ from *Clibanarius* only in having the antennal flagella very short and setose, and the fingers of the chelipeds acuminate.

Isocheles, Stimpson.	Proc. Acad. Nat. Sci. Philad. (1858) 1859, p. 235.

Isocheles, *æquimanus*, Dana.	Stimpson, *loc. cit.*: *Bernhardus æquimanus*, Dana, U. S. Expl. Exp. Crust., pt. I., p. 445, pl. xxvii. fig. 6.	? Valparaiso
,, *wurdemanni*, Stimpson.	*Loc. cit.* and Ann. Lyc. Nat. Hist., N. York, VII. 1862, p. 85.	G. of Mexico.
? *gracilis*, Miers.	Ann. Mag. Nat. Hist. (5) VIII. 1881, p. 277, pl. xvi. fig. 4.	W. Africa.

HOLOPAGURUS.

Holopagurus appears to differ from *Isocheles* only in having the left cheliped larger than the right.

Holopagurus pilosus, Holmes.	Holmes, Synopsis of Californian Stalk-eyed Crustacea, in Occasional Papers Calif. Acad. Sci. VII. 1900, p. 153.	S. Diego Calif., 25 fath.

CALCINUS, Dana.	*Ante.*	
,, HERBSTII, deMan. (and var. LIVIDUS)	*Ante.*	E. Africa to Sandwich Is.
,, ELEGANS, Edw.	*Ante.*	E. Africa to Sandwich Is.
,, GAIMARDI, Edw.	*Ante.*	Maldives to Tahiti.
,, LATENS, Randall.	*Ante.*	Red S. & E. Africa to Sandwich Is.
,, *cristimanus*, Edw.	*Pagurus cristimanus*, Milne Edwards, Ann. Sci. Nat. Zool. (3) X., 1848, p. 64. *Calcinus cristimanus*, Heller, SB. k. Akad. Wien, XLIV., 1861, i. p. 254.	Red Sea.
,, *nitidus*, Heller.	Heller, Novara Crust., 1865, p. 89, pl. vii. fig. 4: deMan, Notes Leyden Mus., XII., 1890, p. 111: Ortmann, Zool. Jahrb., Syst., VI, 1891-92, p. 293.	Tahiti.
,, *nitidus*, var.	Lenz & Richters, Abh. Senckenb. Ges., XII., 1881, p. 426.	Madagascar.
,, TERRÆ-REGINÆ, Haswell.	*Ante.*	Maldives to Queensland.
,, *rosaceus*, Heller.	Heller, SB. k. Akad. Wien, XLIV., 1861, i p. 253.	Red Sea.

CALCINUS *imperialis*, Whitel.	Whitelegge, Rec. Austral. Mus., IV., No. 1, 1901, p. 48, pl. ix.	Lord Howe I. (Australia).
„ *obscurus*, Stimps.	Stimpson, Ann. Lyc. Nat. Hist., N. York, VII., 1862, p. 83.	Panama.
„ *chilensis*, Edw.	Milne Edwards, Ann. Sci. Nat., Zool., (2) VI., 1836, p. 279, and (3) X., 1848 p. 63; and Hist. Nat. Crust., II., p. 230, pl. xxii. fig. 9, 10: Gay, Hist. Fis. Chile, III. Zool., p. 191.	Chili.
„ *californiensis*, Bouv.	Bouvier, Bull. Mus. d'Hist. Nat., Paris, 1898, p. 380.	San José I., California.
„ *tibicen*, Herbst.	*Cancer tibicen*, Herbst, Krabben, II. i. 1791, p. 25, pl. xxiii. fig. 7. *Pagurus tibicen*, Bosc, Hist. Nat. Crust., II, p. 78: Latreille, Hist. Nat. Crust., VI., p. 169: Olivier, Encycl. Méthod., VIII., 1811, p. 646: *Calcinus tibicen*, Rankin, Ann. N. Y. Acad. Sci., XII., 1900, p. 533, pl. xvii. fig. 1: Nobili, Boll. Mus. Torino, XVI., No. 415, 1901, p. 26.	W. Indies: Equador
„ *sulcatus*, Edw. (? = *tibicen*, Herbst.)	*Pagurus sulcatus*, Milne Edwards, Ann. Sci. Nat., Zool. (2) VI., 1836, p. 279, and (3) X., 1848, p. 64; and Hist. Nat. Crust. II., p. 230. *Calcinus sulcatus* Benedict, P. U. S. Nat. Mus. 1893, p. 539, and Bull. U. S. Fish Comm., XX., (2), p. 141 pl. v. fig 3: Nobili Boll. Mus. Torino, XII., 1897, No. 280. p. 4: Verrill, Trans. Connect. Acad., X., 1899-1900, p. 578: Moreira, Arch. Mus. Rio Janeiro, XI., 1901, p. 27.	Bermudas, W. Indies, Brazil.
„ *formosus*, Neumann.	Neumann, Cat. Crust. Heidelb. Mus., 1878, p. 31.	G. of Mexico.
„ *talismani*, Edw. & Bouv.	A. Milne Edwards and Bouvier, Ann. Sci. Nat., Zool., (7) XIII., 1892, p. 225; and Crust. Decap. Travailleur et Talisman, Pt. I., 1900, p. 173, pl. xxiii. fig. 15-18.	Cape Verde Is.
„ *ornatus*, Roux.	*Pagurus ornatus*, Roux, Crust. Médit., 1828, pl. xliii: Milne Edwards, Ann. Sci. Nat. Zool., (2) VI., 1836, p. 277, and (3) X., 1848, p. 63: and Hist. Nat. Crust. II., p. 228: Chevreux and Bouvier, Mem. Soc. Zool. France, 1892, p. 127, pl. iii. fig. 21-24 (*ubi synon.*): Milne Edwards and Bouvier, Crust. Decap. Hirondelle et Princesse Alice, Monaco, 1899, p. 53.	Azores, Canaries, Mediterranean S.
DIOGENES DIOGENES, Herbst.	*Ante.*	Indian Seas, surfline to 68 fath.
„ MERGUIENSIS, deMan	*Ante.*	Indian Seas, to 68 fath.
„ CUSTOS, Fabr.	*Ante.*	India; S. E. Australia, to 18 fath.
„ AFFINIS Hndrsn.	*Ante.*	B. of Bengal; S. E. Australia.

DIOGENES, ,, PLANIMANUS, Hndrsn.	*Ante*	B. of Bengal, Malay Penins.
,, VIOLACEUS, Hndrsn.	*Ante.*	B. of Bengal.
,, *dubius*, Herbst.	*Cancer dubius* Herbst Krabben, III. iv. 1804, p. 22, pl. lx. fig. 5: *Pagurus dubius*, Olivier, Encycl. Meth., VIII., 1811, p. 647.	"Eastern Seas."
,, *intermedius*, deMan.	de Man, in Weber's Zool. Ergebn. Niederl. Ost-Ind., II., 1892, p. 352.	Celebes Sea.
,, *maxtus*, Lnchstr.	Lanchester, P. Z. S., 1902, II., p. 367, pl. xxxiv. fig. 2, 2*b*: Nobili, Boll. Mus. Torino, XVIII, No. 455, 1903, p. 16.	Malay Penins.
,, MILES, Herbst.	*Ante.*	Indian Seas.
,, *desipiens*, Lnchstr.	Lanchester, P.Z.S., 1902, II., p. 366, pl. xxxiv. fig. 1, 1 *a*.	Malay Penins.
,, AVARUS, Heller.	*Ante.*	E. Africa to Torres Str.
,, COSTATUS, Hndrsn.	*Ante.*	E. coast of India.
,, BICRISTIMANUS, Alck.	*Ante.*	Indian Seas, 15—35 fath.
,, RECTIMANUS, Miers.	*Ante.*	E. coast of India to 68 fath.; N. Australia.
,, INVESTIGATORIS, Alck.	*Ante.*	E. coast of India 20 fath.
,, *spinifrons*, DeH.	*Pagurus spinifrons*, De Haan, Faun. Japon. Crust., 1849, p. 212, pl. xlix. fig. 6.	Seas of Japan.
,, *edwardsii*, DeH.	*Pagurus Edwardsii*, De Haan, Faun. Jap. Crust., 1849, p. 211, pl. *l.* fig. 1: *Diogenes Edwardsii*, Stimpson, Proc. Ac. Nat. Sci. Philad. (1858), 1859, p. 246: Ortmann Zool. Jahrb. Syst, VI., 1892, p. 295.	Seas of China & Japan.
,, *penicillatus*, Stimps.	Stimpson, Proc. Ac. Nat. Sci. Philad. (1858), 1859. p. 246.	Japan, 38° N.
,, *spinulimanus*, Miers.	Miers, Ann. Mag. Nat. Hist. (5), V., 1880, p. 374 (footnote).	"Eastern Seas."
,, GARDINERI, Alck.	*Ante.*	Maldives.

Diogenes „ *senex*, Heller.	Heller, Reise Novara. Crust., 1865, p. 85, pl. vii. fig. 3 : Hilgendorf, MB. k. Akad. Berlin, 1878, p. 824 : Haswell, Cat. Austral. Crust. 1882. p.158: Bouvier. Bull. Soc. Philomath. Paris (8) IV. 1891-92, p. 55 : Lanchester. P. Z. S., 1902, II., p 366 · Nobili, Boll. Mus. Torino, XVIII. 1903, No. 455, p. 16.	Red Sea & Mozambique to N. S. Wales.
„ *granulatus*, Miers.	Miers, Ann. Mag. Nat. Hist. (5) V., 1880, p. 373 (footnote) : Haswell, Cat. Austral. Crust., p. 157.	W. Australia (Shark Bay).
„ *guttatus*, Hndrsn.	Henderson, Challenger Anomura, 1888, p. 54, pl. vi. fig. 4.	N. Australia (Torres Str.).
„ *pallescens*, Whtlgge.	Whitelegge, Mem. Austral. Mus., III., 1897, p. 141, pl. vi. fig. 2 *a-c*.	Funafuti Atoll.
„ *brevirostris*, Stimps.	Stimpson, Proc. Ac. Philad. (1858), 1859, p. 245 : Studer, Abh. k. Ak. Berlin (1882), 1883, p 23 : Henderson, Challenger Anomura, p. 53 : Ortmann, Zool. Jahrb., Syst., VI., 1892, p. 295 : Mary Rathbun, P. U. S. N. M., 1900, p. 307.	Atlantic from C. Verde Is. to C. of Good Hope.
„ *denticulatus*, Chev. & Bouv.	Chevreux and Bouvier, Bull. Soc. Zool. France, XVI. 1891, p. 254, and Mem. Soc. Zool. France, V., 1892 p. 122 pl. iii fig. 16-20 : Bouvier, Bull. Soc. Philom. Paris (8) IV. 1891-92, p. 55 : Mary Rathbun, P. U. S. N. M., 1900, p. 307	Atlantic (W. Africa) and Gulf of Aden.
„ *pugilator*, Roux.	*Pagurus pugilator*, Roux, Crust. Médit 1828, pl. xiv. fig. 3, 4. *Diogenes pugilator*, see Chevreux & Bouvier Mem. Soc. Zool., France, 1892, p. 120, and A Milne Edwards & Bouvier, Crust. Decap. Travailleur et Talisman, pt. I.,1900, p. 182 : Nobili, Boll. Mus. Torino, XVII. No. 455, 1903, p. 16 *Pagurus varians*, Costa, Faun. Regn. Nap. Crust. 1838, p 9. pl. ii. fig. 2, *Diogenes varians*, Heller, Crust. Sudl. Europa 1863, p. 170, pl. v. fig. 13, 14 ; Miers, Ann. Mag Nat. Hist. (5) VIII. 1881, pp. 272-274 : Carus Prodr. Faun. Medit. I., 1885, p. 493 : Henderson Proc. Roy. Phys. Soc. Edinb., IX., 1885-88, p. 66. *Pagurus arenarius*, Lucas, Hist. Nat. Anim. Artic. in Exp. Sci. Algerie, Zool., Pt. I., 1849, p. 33, pl. iii. fig. 7. *Pagurus dilwynnii*, Spence Bate, Ann. Mag. Nat. Hist. (2) vii. 1851. p. 320, pl. x. fig. 11, and (3) XVII., 1866, p. 25 : Bell, Brit. Stalk-eyed Crust., 1853, p. 377. *Pagurus ponticus* Kessler, 1859 (*v.* Chevreux & Bouvier : Henderson.) *Pagurus lafonti* Fischer, 1872, and *Pagurus curvimanus* Clement, 1874, (*v.* Chevreux & Bouvier). *Pagurus bocagii* and *Pagurus algarbiensis*, Capello, Jorn. Sci. Lisb., V., 1876, pp. 123, 124, pl. fig. 2 (*v.* Chevreux & Bouvier.)	From the English Chan. and Atlantic coast of Europe and Africa, through the Mediterranean basin to the Red Sea. Also Singapore.
„ *serripes*, Costa	Carus, Prodr. Faun. Medit., I. 1885, p. 494.	Naples.

TROGLOPAGURUS	*Ante.*	
,, MANAARENSIS, Hndrsn.	*Ante.*	G. of Manár.
,, JOUSSEAUMII, Bouv.	*Ante.*	G. of Aden, Persian G, and Arabian S. to 53 fath.
,, *jubatus*, Nobili.	Nobili, Boll. Mus. Zool. Torino, XVIII., No. 455, 1903, p. 17.	Singapore.

STRATIOTES.

The position, and indeed the validity, of this genus are doubtful: it may, perhaps, be identical with *Troglopagurus*. The species upon which it is founded is said by its author to be identical with the species determined by Filhol as *Paguristes setosus*.

Stratiotes setosus (Filhol), Thomson.	Thomson, Trans. and Proc. New Zealand Inst., XXXI., 1898, pp. 171 & 185.	New Zealand.

CANCELLUS, Edw. ,, *canaliculatus*, Hbst.	*Cancer canaliculatus*, Herbst, Krabben, III. 4. 1804, p. 22, pl. lx. fig. 6; *Pagurus canaliculatus* Olivier, Encycl. Method, VIII., 1811, p. 647: *Cancellus canaliculatus*, Milne Edwards & Bouvier, Bull. Soc. Philom. Paris (8) III., 1890-91, p. 70.	"East Indies."
,, INVESTIGATORIS, Alc.	*Ante.*	Off Ceylon, 32 fath.
,, *typus*, Edw.	Milne Edwards, Ann. Sci. Nat. Zool., (2) VI, 1836, p. 287, pl. xiv. fig. 3, 4; and Hist. Nat. Crust., II., p. 243; Milne Edwards & Bouvier, Bull. Soc. Philom. *loc. cit.*	Loc. unknown.
,, *tanneri*, Faxon.	Faxon, Bull. Mus. Comp. Zool., Harvard, XXIV., 1893, p. 167, and Mem. Mus. C. Z. Harvard, XVIII., 1895, p. 52, pl. xi. fig. 1 1*d*.	G of Panama, 66 fath.
,, *ornatus*, Benedict.	Benedict, Proc. U. S. Nat. Mus., 1901, p. 772, fig. 1 2.	G. of Mexico, 30 fath.
,, *spongicola*, Benedict.	Benedict, P. U. S. N. M., 1901, p. 773, fig. 3, 4.	Caribbean S., 130 fath.
,, *parfaiti*, E. & B.	Milne Edwards & Bouvier, Bull. Soc. Philom. Paris (8) III., 1890-91, p. 70 and Crust. Décap. Travailleur et Talisman, Pt. I., 1900, p. 183, pl. xxiii fig. 20-30.	C. Verde Is., W. Africa.
,, *lithodomus*, Zietz.	*Gryllopagurus lithodomus*, Zietz, Trans. Roy. Soc., S. Australia, X. (1887) 1888, p. 298, pl. xiv. fig. 1-4.	S. Australia.

PAGURUS, Fabr.		*Ante.*
,, *arrosor*, Hbst.	Herbst, Krabben, II. v. 1794, p. 170, pl. xliii. fig. 1 (and Bosc, Latreille, Olivier): Milne Edwards and Bouvier, Crust. Decap. Travailleur et Talisman, Pt I., 1900, p. 178: Moreira, Arch. Mus. Rio Janeiro, 1901, p. 24. *Pagurus strigosus*, Bosc, Hist. Nat. Crust., II., 1803, p. 77, pl xi. fig. 3 (and Olivier). *Pagurus striatus*, Latreille, Hist. Nat. Crust, VI., 1804, p. 163 (Olivier; Risso: Desmarest): Roux, Crust. Medit., pl. x: Milne Edwards, Hist. Nat Crust., II., p. 218: De Haan, Faun. Japon. Crust, p. 206, pl. xlix. fig. 1: Lucas, Anim. Artic. in Exp. Sci. Algerie, Zool., pt. i p. 29: Heller, Crust. Sudl. Europ., p. 174: Brocchi, Ann. Sci. Nat. Zool (6) II., 1875, Art. 2, p. 34, pl. xix. fig. 35–39: Miers, Ann. Mag. Nat. Hist. 5) VIII., 1881, p. 274: Studer, Abh. Ak. Berlin, 1882), 1883 p. 23; Carus, Prodr. Faun, Medit., I, p. 494; Henderson, Challenger Anomura, p. 56: Ortmann, Zool. Jahrb., Syst., VI., 1891 92, p. 283: Chevreux and Bouvier, Mem. Soc. Zool. France, 1892, p. 119, (*ubi synon*): Whitelegge Mem. Austral. Mus., IV., pt. 2, 1900, p. 166. *Pagurus incisus*, Olivier, Encycl. Meth., VIII., 1811, p. 641; in Descr. de l'Egypte, pl ix. fig. 1 (Audouin and Savigny Explic. Somm. p 90): Lamarck Hist. Nat. Anim. sans. Vert. V. Crust., p. 250. *Pagurus arrosor* var. *petersi*, A. Milne Edwards. Bull. Mus C Z. Harvard, VIII., 1881, p. 40 (*Aniculus petersi*). Milne Edwards and Bouvier, Mem Mus. C. Z Harvard, XIV., No 3, 1893, p. 162, pl xi. fig 24–35. *Pagurus arrosor* var. *pectinata*, Ortmann, Zool. Jahrb., Syst., 1891-92 p. 284, pl. xii. fig. 10.	West-Indies and Brazil, to 84 fath.: Cadiz, Madeira, C. Verde Is., and Senegambia to 193 fath.; Mediterranean Sea; Philippines to 115 fath.; Japan; S. E. Australia to 48 fath.
,, IMBRICATUS, Edw.	*Ante.*	Ceylon to 32 fath.; New Zealand and Australia.
,, PUNCTULATUS, Oliv.	*Ante.*	Red S. to Sandwich Is.
,, VULNERANS, Thallwitz.	*Ante.*	Persian G. to N. Guinea (to 20 fath.)
,, *aspersus*, Berthold.	(?Rumph, Amboin. Rariteitk., pl. V. fig. K. L.). *Pagurus aspersus*, Berthold, Crust. aus China, p. 21, pl. ii. fig. 1, 1846 (*Pagurus diogenes*, De Haan, Faun. Japon. Crust., p. 208).	China, Japan. "East Indies"
,, *spinimanus*, Edw.	Milne Edwards, Ann. Sci. Nat. Zool. (3), X., 1848, p. 61: Dana, U S Expl Exp., Crust., Pt I, p. 452, pl. xxviii. fig. 5 *a-c*: Ortmann Zool Jahrb., Syst., VI., 1891 92, p. 286: Zehntner, Rev. Suisse de Zool. II., 1894, p. 191.	Seychelles to Paumotu Is.
,, *scutellatus*, Edw.	Milne Edwards, Ann. Sci. Nat. Zool. (3), X., 1848, p. 61.	Zanzibar.

PAGURUS, SETIFER, Edw., Hend.	*Ante.*	E. Africa to Japan (to 32 fath.).
,, WOOD-MASONI, Alc.	*Ante.*	Maldives, Andamans.
,, FABIMANUS, Dana.	*Ante.*	E Africa to Funafuti.
,, SCABRIMANUS, Dana.	Dana, U. S. Expl. Exp., Crust., pt. I. 1852, p. 455, pl xxviii, fig. 8 *a-c*: ?de Man, Notes Leyden Mus., III., 1881, p. 100.	Red S., ?Maldives; Philippines.
,, EUOPSIS, Dana,	*Ante.*	Red S. to Samoa.
,, *affinis*, Edw.	Milne Edwards, Ann. Sci. Nat. Zool., (2) VI., 1836, p. 274, and Hist. Nat. Crust., II., p. 224.	Ceylon.
,, GUTTATUS, Oliv., de Man.	*Ante.*	E. Africa to Sandwich Is.
,, *sanguinolentus*, Q. & G.	Quoy & Gaimard, Voy. Uranie, 1824, p. 532, pl. lxxix. fig. 2: Milne Edwards, Ann. Sci. Nat. Zool. (2) VI., 1836, p. 274.	?Mauritius.
,, *platythorax*. Stimps.	Stimpson, Proc. Acad. Philad. (1858), 1859, p. 246.	Liu Kiu Is.
,, HESSII, Miers.	*Ante.*	Maldives to Arafura S. (to 36 fath.).
,, DEFORMIS, Edw.	*Ante.*	E. Africa to Tahiti.
,, VARIPES, Heller.	*Ante.*	Red S. to Malay Arch. (to 48 fath.).
,, ASPER, DeH.	*Ante*	Maldives to Sandwich Is. (to 34 fath.).
,, DEARMATUS, Hend.	*Ante.*	Maldives to Admiralty Is. (to 28 fath.)
,, *gemmatus*, Edwards.	Milne Edwards, Ann. Sci. Nat. Zool. (3) X., 1848, p. 60: Miers, Ann. Mag. Nat. Hist. (5) V, 1880, p. 375: Borradaile, in Stomap. & Macr. Willey's Exp., p. 424: Lenz, Zool. Jahrb., Syst., XIV. 1901, p. 442.	Mauritius (Richters) to Marquesas.
,, *impressus*, DeH.	DeHaan, Faun. Japon. Crust., 1849, p. 207, pl. xlix. fig. 3: ? Muller, Verh. Nat. Ges. Basel, 1886, p. 472.	Japan. ? Ceylon.
,, *sinistripes*, Stimps.	Stimpson, Ann. Lyc. Nat. Hist. N. York, 1862, p. 82: Nobili, Boll. Mus. Torino, XVI., No. 415, 1901, p. 23.	Panama.

PAGURUS. *venosus*, Edwards.	Milne Edwards, Ann. Sci. Nat. Zool. (3) X., 1848, p. 61; Stimpson, Ann. Lyc. Nat. Hist. N. York, VII., 1862, p. 82: Ortmann, Zool. Jahrb. Syst. VI., 1891-92, p. 285.	W. Indies.
,, *insignis*, Sauss.	Saussure, Mem. Soc. Phys. Hist. Nat. Geneve, XIV. 2, 1858, p. 453, pl. iii. fig. 20; and Mem. Hist. Nat. Mexique, Crust. p. 37, fig. 20: Martens, Arch. f. Nat., XXXVIII., 1872, p. 119.	W. Indies.
,, *loxochelis*, Moreira.	Moreira, Arch. Mus. Rio Janeiro, XI., 1901, p. 24.	Brazil.
,, *calidus*, Risso.	Risso, Hist. Nat. Europ. Merid., V., 1826, p. 329: Roux, Crust. Médit., pl. xv.: Milne Edwards, Hist Nat. Crust., II., 220: Lucas Anim. artic. in Expl. Sci. Algerie, Zool., I., pt. I, p. 29; Heller, Crust. sudl. Europ., p. 176: Carus, Prodr. Faun. Medit., I., p. 495: Henderson, Challenger Anomura, p. 57 (*ubi synon*): Ortmann, Zool. Jahrb., Syst., VI., 1891-92, p. 285: A. Milne Edwards & Bouvier, Crust. Décap. Travailleur et Talisman, pt. I., 1900, p. 180, pl. xxiii. fig. 19, xxviii. fig. 21 (*ubi synon*). *Pagurus setubalensis*, Capello, Jorn. Acad. Lisboa, V., 1876, p. 124, pl. fig. 1. *Pagurus diogenes*, Costa, Faun. Regn. Nap. Paguridæ, p. 5., pl. ii. fig. 2.	Portugal to C. Verde Is.; Mediterranean Sea (to 78 fathoms).
,, *granulimanus*, Miers.	Miers, Ann. Mag. Nat. Hist. (5) VIII., 1881, p. 276, pl. xvi. fig. 3; Chevreux & Bouvier, Mem. Soc., Zool. France, 1892, p. 116, pl. iii. fig. 11-15.	Senegambia, C. Verde Is.
,, *imperator*, Miers.	Miers, Ann. Mag. Nat. Hist. (5) VIII., 1881, p. 275.	St. Helena.

Doubtful species of (?) Pagurus:—

,, *fasciatus*, Bell.	Bell, Brit. Stalk-eyed Crust., 1853, p. 375; Carrington & Lovett, Zoologist (3) VI. 1882, p. 390: Henderson Proc. Roy. Phys. Soc. Edinb. IX., 1885-88, p. 67: Bouvier, Feuille des Jeunes Nat., 1896, p. 9.	English Channel.
,, *villosus*, Gay.	Gay, Hist. Fisica de Chile, pt. III., Zool., p. 188, 1859.	

PETROCHIRUS.

Petrochirus differs from *Pagurus* in having (1) the dactylus of the two pairs of ambulatory legs twisted as in *Parapagurus*, and (2) the finger-tips—either of both chelipeds or of the right alone—calcareous. It also differs from typical *Paguri* in having the chelipeds subequal or the *right* a little the larger.

Petrochirus, Stimpson.	Stimpson, Proc. Ac. Nat. Sci. Philad. (1858) 1859, p 233: Chevreux and Bouvier, Mem. Soc. Zool. France, 1892, p. 111.	

Petrochirus, *granulatus*, Oliv.	*Cancer bahamensis*, Herbst, Krabben, II. iii. 1796, p. 30. *Petrochirus bahamensis*, Mary Rathbun, Ann. Inst. Jamaica I. i. 1897, p. 42 : Benedict, Bull. U. S. Fish. Comm. (XX) (2) p. 140. *Pagurus granulatus*, Oliv. Encycl. Meth., VIII., 1811, p. 640 ; Lamarck, Hist. Nat. Anim. sans Vertbr., V., 1818, p. 220 : Desmarest, Dict. Sci. Nat. XXVIII. 1823, p. 288 : Milne Edwards, Ann. Sci. Nat Zool. (2) VI., 1836, p. 275, and (3) X., 1848, p. 61, and Hist. Nat. Crust., II., 225 : Dana U. S. Expl. Exp., Crust., Pt. I., p. 453 : v. Martens, Arch. f. Nat., XXXVIII., 1872, p. 120 : Henderson, Challenger Anomura, p. 56. *Petrochirus granulatus*, Stimpson, P. A. N. S. Philad. (1858) 1859, p. 233 : Heller, Novara Crust., p. 85 ; Ortmann, Zool. Jahrb., Syst., VI., 1892, p. 289 : Doflein, SB. Bayer. Ak. München, 1899, p. 178.	West Indies and vicinity, from Florida to Rio Janeiro ; Cape of Good Hope.
,, *pustulatus*, Edw.	*Pagurus pustulatus*, Milne Edwards, Ann. Sci. Nat. Zool. (3) X., 1848, p. 60. *Petrochirus pustulatus*, Chevreux and Bouvier, Mem. Soc. Zool. France, 1892, p. 112, pl. iii. fig. 6—10 : Mary Rathbun, P. U. S. Nat. Mus., 1900, p. 303.	W. Africa.
,, *cavitarius*, Ozorio.	Ozorio, Jorn. Acad. Lisb., XI., 1887, p. 228 : Mary Rathbun, P. U. S. Nat. Mus., 1900, p. 303.	W. Africa.
ANICULUS, Dana.	*Ante.*	
,, ANICULUS, Fabr.	*Ante.*	E. coast of Africa to Paumotu Archo.
,, *elegans*, Stimps.	Stimpson, Ann. Lyc. Nat. Hist., N. York, VII. 1862, p. 83.	Panama.
,, *longitarsis*, Streets.	Streets, Proc. Ac. Nat. Sci. Philad., XXIII., 1871, p. 240.	Panama.
,, TENEBRARUM.	*Ante.*	Off C. Comorin, 102 fath.
,, STRIGATUS, Herbst.	*Ante.*	E. coast of Africa to Tahiti.

Subfamily EUPAGURINÆ.

PARAPAGURUS, Smith	*Ante.*	
,, PILOSIMANUS, Smith	*Ante.*	Depths of Atlantic, Pacific and Indian Oceans, to 2260 fath.

PARAPAGURUS, PILOSIMANUS, var. ABYSSORUM, A. M. E.	*Ante.*	
,, ,, var. *scabra*, Hend.	Henderson, Challenger Anomura, p. 89, pl. ix. fig. 3.	N. Atlantic, 2175 fath.
,, *affinis*, Hend.	Henderson, *op. cit.* p. 90, pl. ix. fig. 4.	South of Philippines, 500 fath.
,, MINUTUS Hend.	*Ante.*	Arabian S., 719 fath.
,, ANDERSONI, Hend.	*Ante.*	Arabian S., 719 fath.
,, ,, var. BREVIMANUS, Hend.	*Ante.*	Arabian S., 430 to 719 fath.
,, *gracilis*, Hend.	Henderson, *op. cit.* p. 92, pl. x. fig. 3.	S. Atlantic, off Pernambuco 350 fath.
,, *dimorphus*, Studer.	*Eupagurus dimorphus*, Studer, Abh. k. Akad. Berlin (1882), 1883, p. 24, pl. ii. fig. 11, 13: *Parapagurus dimorphus* Henderson, Challenger Anomura, p. 86, pl. x. fig. 1: Stebbing, Marine Inv. S. Africa, Crust., 1900, p. 28.	S. Atlantic (Tristan d'Acunha & C. of Good Hope, 110 to 150 fath.) Indian Ocean (Marion I.) 140 to 310 fath.: S. E. Pacific (off Patagonia) 245 fath.
,, *latimanus*, Hend.	Henderson, *op. cit.* p. 91, pl. x. fig. 2.	New Zealand 10 fath.
,, *mertensii*, Brandt.	*Pagurus mertensii*, Brandt, in Middendorf's Reise Sibiriens, Zool. II. 1851, i. p. 112: *Eupagurus mertensii*, Stimpson, Journ. Boston Soc. Nat. Hist., VI., 1857, p. 483: Benedict, P. U. S. Nat. Mus., XV., 1892, p. 2: Doflein, Fauna Arctica, I. 2. 1900, p. 341: *Parapagurus mertensii*, Holmes, Synopsis Calif. Stalk-eyed Crust. in Occas. Papers Calif. Acad. Sci. VII., 1900, p. 155.	Vancouver, by way of Aleutian Is. to Kamtschatka 19 fms.
SYMPAGURUS, Smith.	*Ante.*	
,, *pictus*, Smith.	S. I. Smith, P. U. S. N. M., VI. (1883), 1884, p. 37, pl. v. fig. 2, and pl. vi. fig. 5—8; and Albatross Crust., 1884, p. 10, pl. iv. fig. 3: Milne Edwards & Bouvier, Mem. Mus. Comp Zool. Harvard. XIV. No. 3, 1893, p. 60; and Bull. Soc. Ent. Ital., 1891, p. 240; and Bull. Soc. Zool. France, 1897, p. 133.	Off coast Massachusetts, &c., 164 fath.; Barbadoes, 282 fath.

SYMPAGURUS. *pilimanus*, A. M. E.	Milne Edwards & Bouvier, Mem. Mus. C. Z. Harvard. XIV, No. 3, 1893, p. 63, pl v. fig. 8–20; and Bull. Soc. Zool France, XXII., 1897, p 133. (*Eupagurus pilimanus*, A. Milne Edwards, Bull. Mus. C. Z. Harvard VIII. 1880, p. 43.)	West Indies, 171—288 fath.
,, BICRISTATUS, E. & B. and var. INDICUS.	*Ante.*	Caribbean S., 508 fath.; Eastern N. Atlantic, 55—880 fath.; Indian Seas to 405 fath.
,, ARCUATUS, E. & B. and var MONSTROSUS.	*Ante.*	West Indies, 138—229 fath; Arabian S. and B. of Bengal, 142—464 fath.
,, *gracilipes*, A. M. E.	A. Milne Edwards, Bull. Soc. Zool. France, XVI, 1891. p. 132: Milne Edwards and Bouvier, Ann Sci Nat. Zool. (7) XIII., 1892. p. 205; and Crust Decap. Hirondelle, etc., Monaco, 1894 p. 68, pl ix, fig. 18—34; and Monaco, 1899, p. 58; and Bull, Soc. Zool. France, 1897 p 133; and Crust. Decap. Travailleur et Talisman, Pt. I., 1900, p. 194, pl. xxiv. fig. 7-8.	Eastern N. Atlantic, Azores to C. Verde, 220—750 fath.
,, *nudus*, A. M. E.	A. Milne Edwards, Bull, Soc. Zool. France, XVI. 1891, p. 131: Milne Edwards and Bouvier, Crust. Decap. Hirondelle. Monaco. 1894. p. 67, pl. x. fig. 18—26; and Bull. Soc. Zool. France, XXII. 1897, p. 133.	Azores, 750 fath.
,, *grimaldii*, E. & B.	A. Milne Edwards and Bouvier, Bull. Soc. Zool. France, XXII., 1897, pp. 133, 134; and Crust. Decap. Hirondelle et Princesse Alice, Monaco, 1899, p. 57, pl. iv. fig. 1—5.	Azores, 744 fath.
,, *rutichelis*, A. M. E.	*Eupagurus rutichelis* A. Milne Edwards, Bull. Soc. Zool France, XVI. 1891, p. 133. *Sympagurus rutichelis*, Milne Edwards and Bouvier, Ann. Sci Nat. Zool. (7) XIII, 1892, p. 206; and Crust. Decap. Hirondelle, etc. Monaco 1894, p 70, pl. x fig. 1—14; and Monaco, 1899, p. 59; and Bull. Soc. Zool. France. XXII., 1897, p 133; and Crust. Decap. Travailleur et Talisman, Pt. I. 1900, p 199, pl. xxiv. fig 9.	Azores and Madeira 217 to 325 fath.
,, *diogenes*, Whitel.	Whitelegge, Mem. Austral. Mus., IV., Pt. 2, 1900 p. 172, pl. xxiv. fig. 3 (closely related to *S. arcuatus* var. *monstrosus*).	S. E. Australia, 22—56 fath.
PAGURODES, Hend.	*Ante.*	
,, *inarmatus*, Hend.	Henderson, Challenger Anomura, p. 94, pl. x. fig. 5.	Indian Ocean, 1375 fath.; off N. Zealand, 1100 fath.

PAGURODES, LIMATULUS, Hend.	*Ante.*	Off Travancore. 430 fath.; off Philippines, 500 fath.
„ *piliferus*, Hend.	Henderson, *op. cit.* p. 96, pl. ix. fig. 5.	Philippines, 100—115 fath.
NEMATOPAGURUS, E. & B.	*Ante.*	
„ *longicornis*, E. & B.	Milne Edwards and Bouvier, Ann. Sci. Nat. Zool. (7) XIII. 1892, p. 210: Crust. Decap. Hirondelle et Princesse Alice, Monaco, 1899, p. 60; Crust. Decap. Travailleur et Talisman, Pt. I., 1900, p. 201, pl. xxiv. fig. 10—16.	Western Mediterranean and E. Atlantic from N. of Spain to C. Verde, from about 42—1410 fath.
„ INDICUS, Alc.	*Ante.*	Off Travancore coast, 102 fath.
„ GARDINERI, Alc.	*Ante.*	Maldives.
„ MURICATUS, Hend.	*Ante.*	Maldives: off Ceylon, 28—34 fath.
„ SCUTELLICHELIS, Alc.	*Ante.*	Arabian Sea, 824 fath.
„ SQUAMICHELIS, Alc.	*Ante.*	Andaman Sea, 185 fath.
EUPAGURUS, Brandt.	*Ante.*	
„ PERGRANULATUS, Hend.	*Ante.*	Andamans & Ceylon, 20—28 fath.
„ ZEBRA, Hend.	*Ante.*	Andamans, Ceylon, Persian G. to 49 fath., N. W. Australia.
„ INVESTIGATORIS, Alc.	*Ante.*	Malabar coast, 68—148 fath.
„ MACARDLEI, Alc.	*Ante.*	Persian Gulf, 40 fath.
„ CARPOFORAMINATUS, Alc.	*Ante.*	B. of Bengal; Malabar coast; 10—148 fath.

EUPAGURUS, „ NEPHROMMA, Alc.	*Ante.*	Arabian S., 824 fath.
„ JANITOR, Alc.	*Ante.*	Maldive Is.
„ SP.	*Ante.*	Arabian S., 487 fath.
„ *hirtimanus*, White.	*Pagurus hirtimanus*, White, List Crust. Brit. Mus., 1847, p. 60: *Eupagurus japonicus?* Miers, Ann. Mag. Nat. Hist. (5) V. 1880, p. 375, pl. xiv. fig. 6-7: *Eupagurus hirtimanus*, de Man, Arch. f. Naturges. 1887, i. p. 426 and Notes Leyden Mus., XII., 1890, p. 107: Ortmann in Semon's Zool. Forschungsr. Crust., p. 32.	Amboina to Fiji.
„ spp.	de Man, Abh. Senckenberg. nat. Ges., XXV., iii. 1902, p. 730.	Ternate and Batchian.
„ "*kiwa*" Miers.	Miers, Zool. H. M. S., Alert, 1884, p. 267, pl. xxviii. fig. C (the specific name appears to be pre-occupied).	Arafura S., 32—36 fath.
„ *compressipes*, Miers.	Miers, Zool. H. M. S. Alert, 1884, p. 266, pl. xxviii. fig. B.	N. E. Australia.
„ *minutus*, Hess.	*Pagurus minutus* (part) Hess, Archiv f. Naturges. xxxi. i. 1865, p. 160 (and Haswell): *Eupagurus minutus*, de Man, Zool. Jahrb., Syst., II, 1887, p. 705.	Sydney.
„ *acantholepis*, Stimps.	Stimpson, Proc. Acad. Philad. (1858), 1859, p. 251 (and Haswell).	Port Jackson.
„ *sinuatus*, Stimps.	Stimpson, *l.c.* (and Haswell): Stead, Zoologist, 1898, p. 207.	Port Jackson.
„ *filholi*, de Man.	de Man, Zool. Jahrb., Syst., II. 1887, p. 707.	Sydney.
„ *lacertosus*, Hend.	Henderson, Challenger Anomura, 1888, p. 63, pl. vi. fig. 7.	Off E. coast N. Zealand, 275 fath.
„ „ var. *nana*, Hend.	Henderson, *op. cit.* p. 64, pl. vii. fig. 1: Whitelegge Mem. Austral. Mus., IV., Pt. 2, 1900, p. 169: Ortmann, Zool. Jahrb. Syst., VI., 1892, p. 306.	S. E. Australia to 52 fath.
„ *novi-zealandiæ*, Dana,	*Bernhardus novi-zealandiæ* Dana, U. S. Expl. Exp. Crust., Pt. I., 1852, p. 440, pl. xxvii. fig. 27. *Pagurus cristatus*, White (*nec* Edw.) List Crust. Brit. Mus., 1847, p. 59. *Eupagurus novizealandiæ*, Stimpson, *l.c.*, Heller Novara Crust., p. 92: Miers, Cat. Crust. N. Z., p. 63: Filhol, Miss Pile Campbell, III., Pt. 2, No. 1, Crust. N. Z., p. 412: Thomson, Trans. N. Z. Inst. 1898, p. 173, pl. xx. fig. 3—5: Lenz, Zool. Jahrb., Syst., XIV., 1901, p. 445.	New Zealand and Falkland Is.

Eupagurus, *cristatus*, Edw.	*Pagurus cristatus*, Milne Edwards, Ann. Sci. Nat. Zool., 1836, p. 269 : Hist. Nat. Crust., II., 218. *Eup. cristatus*, Miers, Cat. Cr. N. Z., p. 62 : Filhol, *tom. cit.* p. 412.	New Zealand.
,, *spinulimanus*, Miers.	Ann. Mag. N. H. (4) XVII., 1876, p. 222, and Cat. Cr. N. Z., p. 63, pl. i. fig. 6 : Filhol *tom. cit.* p. 423 : Thomson, *tom. cit.* p. 173.	New Zealand.
,, "*edwardsii*" Filhol	Filhol (*nec* Dana *nec* Lenz), Bull. Soc. Philom. (7) VIII., 1883. p. 66, and in Miss. l'ile Campbell, &c. p. 412, pl. lii. fig. 6 : Thomson, *tom. cit.* pp. 173, 182, pl. xx. fig. 6, 7. (The specific name belongs to one of Dana's species.)	New Zealand.
,, *kirkii*, Filhol.	Filhol, *Bull. cit.* p. 66 ; *tom. cit.* p. 416, pl. li. fig. 5 : Thomson, *tom. cit.* pp. 173, 175, pl. xx. fig. 8—10. (Not *kirkii* Miers, 1884.)	New Zealand.
,, *cookii*, Filhol.	Filhol, *Bull. cit.* p. 67 ; *tom. cit.* p. 417, pl. li. fig. 2 : Thomson, *tom. cit.* pp. 173, 176, pl. xx. fig. 11—13.	New Zealand to 110 fathoms.
,, *stewarti*, Filhol.	Filhol, *Bull. cit.* p. 67 ; *tom. cit.* p. 418, pl. li. fig. 3 : Thomson, *tom. cit.* p. 173.	New Zealand.
,, *hectori*, Filhol.	Filhol, *Bull. cit.* p. 67 ; *tom. cit.* p. 419, pl. li. fig. 1 : Thomson, *tom. cit.* pp. 173, 177 : Lenz, *tom. cit.* p. 447.	New Zealand.
,, *campbelli*, Filhol	Filhol, *tom. cit.* p. 421, pl. lii. fig. 5 : Thomson, *tom. cit.* p. 173.	New Zealand.
,, *traversi*, Filhol.	Filhol. *tom. cit.* p. 422, pl. l. fig. 4 : Thomson, *tom. cit.* pp. 173, 179, pl. xxi. fig 1—3 : Lenz, *tom. cit.* p. 447.	New Zealand.
,, *thompsoni*, Filhol.	Filhol. *tom. cit.* p. 423, pl. li. fig. 6 : Thomson, *tom. cit.* p. 173.	New Zealand.
,, *rubricatus*, Hend	Henderson, Challenger Anomura, 1888, p. 69, pl. vii. fig. 4 : Thomson, *tom. cit.* p. 173.	Off New Zealand, 700 fath.
,, *intermedius*, Lenz.	Lenz, Zool. Jahrb., Syst., XIV., 1901, p. 446, pl. xxxii. fig. 8—10.	New Zealand.
,, *samoensis*, Ortm.	Ortmann, Zool. Jahrb., Syst., VI., 1892, p. 312.	Samoa.
,, *laevimanus*, Ortm.	Ortmann, *tom. cit.* p. 302.	Tahiti.
,, *spinulentus*, Hend.	Henderson, Challenger Anomura, p. 68, pl. vii. fig. 3.	Philippines, 100—115 fath.
,, *megalops*, Stimps.	Stimpson, Proc. Ac. Nat. Sci. Philad. (1858), 1859, p. 248.	N. China Sea, 26 fath.

Eupagurus, *pilosipes*, Stimps.	Stimpson, P. A. N. S. P., 1859, p. 249.	Liu Kiu Is.
,, *seriespinosus*, Thallw.	Thallwitz, Abh. u. Ber. Zool. Mus. Dresden, 1890-91, No. 3, p. 34.	China or Japan.
,, *brachiomastus*, Thallw.	Thallwitz, *tom. cit.* p. 35; Ortmann, *tom. cit.* p. 312.	China and Japan.
,, *lanuginosus*, DeH.	*Pagurus lanuginosus*, DeHaan, Faun Japon., Crust 1849, p. 207 pl. xlix. fig. 5 *Eup lanuginosus*, Ortmann, *loc. cit.*: Doflein, Abh. Bayer. Akad. Wiss., XXI., iii. 1902, p. 647.	Japan.
,, *conformis*, DeH.	*Pagurus conformis*, DeHaan, *op. cit.*; *Eup. conformis*, Ortmann, Doflein, *t. cc.*	Japan.
,, *constans*, Stimps.	Stimpson, Proc. Acad. Nat. Sci. Philad (1858) 1859, p. 248: Henderson, Challenger Anomura, p. 67, pl. vi. fig. 8: Ortmann, Doflein, *t. cc.*	Japan to 100 fath.
,, *gracilipes*, Stimps.	Stimpson, *loc. cit.*: Doflein, *tom. cit.* p. 547, pl. vi. fig. 6—8.	Japan.
,, *pectinatus*, Stimps.	Stimpson, *tom. cit.* p. 249.	Japan.
,, *japonicus*, Stimps.	Stimpson, *tom. cit.* p. 250: Ortmann, *tom. cit.* p. 309.	Japan.
,, *tricarinatus*, Stimps.	Stimpson, *tom. cit.* p. 251.	Japan.
,, *angustus*, Stimps.	Stimpson, *tom. cit.* p. 250.	Japan.
,, *dubius*, Ortm.	Ortmann, Zool. Jahrb. Syst. VI., 1892, p. 307: Doflein, *tom. cit.* p. 646.	Japan.
,, *triserratus*, Ortm.	Ortmann, *tom. cit.* p. 308.	Japan, 50—100 fath.
,, *similis*, Ortm.	Ortmann, *tom. cit.* p. 310: Doflein *tom. cit.* p. 646.	Japan.
,, *barbatus*, Ortm.	Ortmann, *tom. cit.* p. 311.	Japan.
,, *obtusifrons*, Ortm.	Ortmann, *tom. cit.* p. 313.	Japan, 150 fath.
,, *ophthalmicus*, Ortm.	Ortmann, *tom. cit.* p. 314.	Japan, 50 fath.
,, *lepidochirus*, Dofl.	Doflein, Abh. Bayer. Akad. Wiss., XXI., iii. 1902, p. 623.	Japan.

EUPAGURUS, *cavimanus*, Miers.	Miers, P. Z. S., 1879, pp. 21, 48, pl. iii. fig. 1.	N. Japan, 100 fath.
„ *ochotensis*, Brandt.	Brandt, in Middendorff's Sibirische Reise, II. i. 1851, p. 108 : Stimpson, P. A. N. S. Philad, 1859, p. 248 : Holmes, Occas. Papers Calif. Acad. Sci., VII , 1900, p. 137 : Benedict, P. U. S. Nat. Mus., 1901 p. 463. (= *Bernhardus armatus*, Dana U. S. Expl. Exp. Crust., Pt. I., p. 442 : = *Eupagurus armatus*, Stimpson, Journ. Boston Soc. Nat. Hist., 1857, p. 484.)	N. Japan, S. of Okhotsk : Vancouver I. to California, 20—62 fath.
„ *hirsutiusculus*, Dana.	*Bernhardus hirsutiusculus*, Dana, U. S. Expl. Exp. Crust., Pt. I., p. 443, pl. xxvii. fig. 3. = *Eup. hirsutiusculus*, Stimpson *t. cc.* : Holmes, *tom. cit.* p. 143.	N. Japan, Bering Sea; Puget Sound to S California.
„ *samuelis*, Stimps.	Stimpson, Journal Boston Soc., 1857, p. 482 : P. A. N. S. Philad., 1859, p. 250 : Ann. Lyc. Nat. Hist. N. Y., 1862, p. 90 : Ortmann, *tom. cit.* p. 301 : Holmes *tom. cit.* p. 144 : Doflein, *tom. cit.* p. 646.	Japan : California.
„ *middendorffii*, Brandt.	Brandt, in Middendorf's Sibirische Reise, II. i. 1851, p. 108, pl. v. fig. 1—16 ; Stimpson, Ortmann, Holmes, Doflein, *l. cc.* ; Calman, Ann. Acad. Sci. N. Y., 1898, p. 260.	N. Japan, S. of Okhotsk. Alaska ; Puget Sound (Washington).
„ *splendescens*, Owen.	*Pagurus splendescens*, Owen, Zool. H. M. S. Blossom, Crust., p. 81. pl. xxv. fig. 1 : Calman, Ann. Acad. Sci. N. Y., 1898 p. 260 : M. J. Rathbun, Rep. Fur Seal Inv., 1899, p. 556 ; Holmes, *tom. cit.* p. 234 ; Doflein, Fauna Arctica I. ii. 1900, p. 343.	Kamtschatka, Bering S., Puget Sound.
„ *tenuimanus*, Stimps.	*Bernhardus tenuimanus*, Dana, U. S. Expl. Exp. Crust. Pt. I., p. 447, pl. xxvii., fig. 7. *Eup. tenuimanus*, Stimpson, Journ. Boston Soc. N. H. 1857, p. 583 ; Calman, *t. c.* p. 260 ; Holmes, *t. c.* p. 148 : Lenz, Zool. Jahrb. Syst., 1901, p. 445, pl. xxxii. fig. 6, 7.	Alaska, Vancouver, Puget Sound.
„ *trigonochirus*, Stimps.	Stimpson, P. A. N. S. Philad., 1859, p. 249 : M. J. Rathbun *l.c.* : Holmes *t. c.* p. 138.	Arctic O., Behring S., 10—57 fath.
„ *kennerlyi*, Stimps.	Stimpson, P. A. N. S. Philad, 1864, p. 153 : Benedict, P. U. S. N. M., 1892, p. 19 : Holmes, *t. c.* p. 143.	Alaska (to 19 fath.), Puget Sound.
„ *alaskensis*, Bened.	Benedict (1) Proc. U. S. Nat Mus., XV., 1892, p. 2 ; and (2) Proc. U. S. Nat. Mus., XXIII., 1901, p. 456 : M. J. Rathbun, *act. cit.* p. 555 : Holmes, *t.c.* p. 135. (For N. Pacific forms of *E. bernhardus*.)	Bering S (to 47 fath.) ; British Columbia, Washington, 31—67 fath.
„ *aleuticus*, Bened.	*Benedict, t. c.* (1) p. 3, and (2) p. 460 : Rathbun, *l.c.* : Holmes, *t. c.* p. 136.	Pering S. to Oregon, 13—238 fath.
„ *capillatus*, Bened	Benedict, *t. c* (1) p. 8 : Holmes, p. 138.	Alaska. Washington, 40 fath.

EUPAGURUS, „ *brandti*, Bened.	Benedict (1) p 9: Rathbun, p. 555: Holmes, p. 139.	Bering S. to 80 fath.
„ *dalli*, Bened.	Benedict (1) p 9: Rathbun, p. 555: Holmes, p. 139	Bering S., 10—26 fath.
„ *tanneri*, Bened.	Benedict (1) p. 10: Holmes, p. 140.	Alaska: Washington, 167—559 fath.
„ *confragosus*, Bened.	Benedict (1) p. 11: Rathbun, p. 555: Holmes, p. 141.	Bering S. (to 65 fath,) Washington, 68—178 fath.
„ *cornutus*, Bened.	Benedict (1) p. 12.	Alaska.
„ *townsendi*, Bened.	Benedict (1) p. 13.	Alaska.
„ *rathbuni*, Bened.	Benedict (1) p. 14; Rathbun, p. 556: Holmes, p. 140.	Alaska, Bering S., 47—65 fath.
„ *beringanus*, Bened.	Benedict (1) p. 17.	Bering Sea.
„ *undosus*, Bened.	Benedict (1) p. 18: Rathbun, p. 556.	Bering S. to 20 fath.
„ *setosus*, Bened.	Benedict (1) p. 19.	Alaska.
„ *munitus*, Ben.	Benedict (1) p. 19: Holmes, p. 150.	Alaska.
„ *gilli*, Ben.	Benedict (1) p. 20.	Alaska.
„ *newcombei*, Ben.	Benedict (1) p. 17: Holmes, p. 142.	British Columbia.
„ *granosimanus*, Stimps.	Stimpson, Ann. Lyc. Nat. Hist. N. Y., VII., 1862, p. 90: Holmes, p. 146.	Washington, California.
„ *hemphilli*, Ben.	Benedict (1) p. 16: Holmes, p. 147.	Upper California.
„ "*minimus*," Holmes.	Holmes. Occasional Papers Calif. Acad. Sci., VII., 1900, p. 145 (the specific name was occupied in 1892, by Chevreux and Bouvier).	San Diego, California, 30 fath.
„ *smithi*, Ben.	Benedict (1) p. 4.	G. of California.
„ *albus*, Ben.	Benedict (1) p. 6.	G. of California.
„ *gladius*, Ben.	Benedict (1) p. 7.	G. of California.

EUPAGURUS, *benedicti*, Bouv.	Bouvier, Bull. Mus. d'Hist. Nat. Paris, 1898, p. 381, (for *Eup. minutus*, Ben. *nec* Hess, Benedict (1) p. 14).	G. of California.
,, *mexicanus*, Ben.	Benedict (1) p. 22.	G. of California.
,, *roseus*, Ben.	Benedict (1) p. 22.	G. of California.
,, *coronatus*, Ben.	Benedict (1) p. 24.	G. of California.
,, *varians*, Ben.	Benedict (1) p. 24 : Bouvier, *t. c.* p. 382.	G. of California.
,, *cervicornis*, Ben.	Benedict (1) p. 25.	G. of California.
,, *parvus*, Ben.	Benedict (1) p. 26.	G. of California.
,, *fusco-maculatus*, Bouv.	Bouvier, Bull. Mus. d'Hist. Nat. Paris, 1895, p. 7.	Lr. California.
,, *lepidus*, Bouv.	Bouvier, *act. cit.* 1898, p. 381.	G. of California.
,, *venustus*, Bouv.	Bouvier, *act. cit.* 1898, p. 383.	G. of California.
,, *californiensis*, Ben.	Benedict (1) p. 21 : Faxon, Mem. Mus. Comp. Zool., Harvard, XVIII., 1895, p. 55, pl. xi. fig. 2 : Bouvier, *act. cit.*, 1898, p. 382 : Holmes, p. 149.	California : Cocos I. (Panama Pacific) 66 fath.
,, *purpuratus*, Bouv.	Benedict (1) p. 15.	Galapagos Is.
,, *edwardsi*, Dana.	*Bernhardus edwardsi*, Dana, U. S. Expl. Exp. Crust. Pt. I., 1852, p. 447. *Bernhardus perlatus* Kinahan (*nec* Edw.) Journ. Roy. Soc. Dublin, 1857, p. 352. *Eup. edwardsi* Lenz. Zool. Jahrb., Syst. Suppl. Band V. ii. 1902, p. 739, pl. xxiii. fig. 1.	Peru, Chili.
,, *obesocarpus*, Dana.	Dana, *op. cit.* p. 445, pl. xxvii. fig. 5.	? Valparaiso, Chili.
,, *perlatus*, Edw.	*Pagurus perlatus*, Milne Edwards, Ann. Sci. Nat. Zool. (3) X., 1848, p. 60 : *Eup. perlatus*, Lenz., *t.c.* p. 738.	Chili.
,, *barbiger*, A. M. E.	*Bernhardus barbiger*, A. Milne Edwards, Miss. Sci. Cap Horn, Crust., 1891, p. 28, pl. iii. fig. 1 : Benedict (2) p. 466 : Lenz, *t.c.* p. 737.	Chili; Magellan Str
,, *comptus*, White.	*Pagurus comptus*, White P. Z. S., 1847, p. 122, and Ann. Mag. Nat. Hist. (2) I. 1848, p. 224 : *Eup. comptus*, Miers, Zool. Erebus and Terror, II, 1875, p. 3 pl. ii. fig. 5, and P. Z. S., 1881, pp. 63, 72 : A. Milne Edwards, Miss Sci. Cap Horn. Crust., p. 29 : Stebbing. P. Z. S., 1900, p. 535 : Lenz, *t. c.*, p. 738. (= *Pagurus forceps*, Cunningham, Trans. Linn. Soc., Zool., 1871, p. 495.)	Chili, Patagonia, Falkland Is.

EUPAGURUS, *comptus* var. *latimanus*, Miers.	Miers, *l. c.*	Patagonia.
,, "var. *jugosa*, Hend.	Henderson, Challenger Anomura, p. 67, pl. vii. fig 2: Ortmann, Zool. Jahrb. Syst., VI., 1892, p. 303.	Patagonia; Falkland Is.
,, *patagoniensis*, Ben.	Benedict (1) p. 3, and (2) p. 465 and fig.	E. coast Patagonia, to 43 fath.
,, *exilis*, Ben.	Benedict (1) p. 6.	Off Rio de la Plata.
,, *criniticornis*, Dana.	*Bernhardus criniticornis*, Dana, *op. cit.* p. 448, pl xxvii. fig 8.	Rio Janeiro.
,, *occlusus*, Hend.	Henderson, Challenger Anomura, p. 70, pl. vii. fig. 6.	Off Pernambuco, 350 fath.
,, *curacoensis*, Ben.	Benedict (1) p. 21.	Curacoa I. Caribbean S. (?).
,, *defensus*, Ben.	Benedict (1) p. 7.	G. of Mexico.
,, *hispidus*, Ben.	Benedict (1) p. 26.	Havana (Cuba).
,, *dissimilis*, E. & B.	Milne Edwards and Bouvier, Mem. Mus. C. Z., Harvard, XIV. No 3. 1893, p. 146, pl. x. fig. 19-25.	Yucatan Bank, 20 fath.
,, *marshi*, Ben.	Benedict, Bull. U. S. Fish. Comm. XX (2) p. 139.	Porto Rico.
,, *brevidactylus*, Stimps.	Stimpson, Ann. Lyc Nat. Hist., N. York, VII. 1862, p. 91.	Barbados.
,, *operculatus*, Stimps.	Stimpson, Ann. Lyc. Nat. Hist., N. York, VII. p. 92, pl. i. fig. 9, 10.	Florida.
,, *impressus*, Ben.	Benedict (1) p. 5.	Florida.
,, *floridanus*, Ben.	Benedict (1) p. 5.	Florida.
,, *corallinus*, Ben.	Benedict (1) p. 23.	Florida.
,, *bouvieri*, Fax.	Faxon Mem. Mus. C. Z., Harvard, XVIII. No. 15, 1895, p. 57 (=*E smithii*. E. & B., *nec* Benedict, Mem. Mus. C. Z. XIV. No. 3, 1893, p. 140, pl. x. fig. 1—12, *nom. præocc.*)	Florida, 125—128 fath.

EUPAGURUS,		
,, *stimpsoni*, E. & B.	Milne Edwards and Bouvier, Mem. Mus. C. Z. Harvard, XIV, No. 3, 1893, p. 144, pl. x. fig. 13—18.	W. Florida, 14 fath.
,, *annulipes*, Stimps.	Stimpson, Ann. Lyc. *cit.* p. 243: Kingsley, Proc. Ac. Nat. Sci. Philad, 1878, p. 326.	N. Carolina.
,, *pubescens*, Dana.	*Bernhardus pubescens*, Dana, *op. cit.* p. 444, pl. xxvii. fig. 4.	Brazil? to Massachusetts?
,, *longicarpus*, Say.	*Pagurus longicarpus*, Say, Journ. Ac. Nat. Sci. Philad, 1817, p. 163. *Eup. longiçarpus*, Kingsley P. A. N. S. Philad. 1878 p. 326: S. I. Smith Trans. Connect. Acad. V. 1879, p. 47, and Abatross Crust. 1884 and 1886.	Brazil to Massachusetts, to 20 fath.
,, *pollicaris*, Say.	Say, *l.c.* p. 162: Milne Edwards, Hist. Nat. Crust. II. 237: Kingsley *l.c.*: S. I. Smith Albatross Crust. 1884 and 1886.	Florida to Massachusetts.
,, *politus*, Smith	Smith, Bull. Mus. C. Z. Harvard X. 1882, pl. ii. fig. 5, and P. U. S. N. M. VI. 1883, p. 27, pl. iv. fig. 4, and Albatross Crust. 1884 and 1886.	Carolina to Massachusetts, 38—428 fath.
,, *acadianus*, Ben.	Benedict (2) p. 454 and fig. (for N. E. American forms of *E. bernhardus*, L.)	Newfoundland to Chesapeake B. 7—265 fath.
,, *bernhardus*, Linn.	For references and synonomy see Henderson, Proc. Roy. Phys. Soc. Edinb. IX. 1885-88, p. 68; and Benedict, Proc. U. S. Nat. Mus. XXIII. 1901, p. 452 (=*P. streblonyx*, Leach, Malac. Pod. Brit. pl. xxvi. fig. 1—4, and *P. ulidianus*, Thomson, Rept. Brit. Assoc. 1843, p. 267).	Scandinavian and British Seas, B. of Biscay, Mediterranean. [Atlantic shores of N. America? Bering S. to Kamtschatka?]. Shore to great depths.
,, *prideauxii*, Leach.	Leach Malacost. Pod. Brit. 1815, pl. xxvi. fig. 5, 6. See Henderson, *tom. cit.* p. 69 (=*P. solitarius*, Risso, Hist. Nat. Eur. mérid. V. 1826, p. 40), See also Milne Edwards and Bouvier, Crust. Décap. Hirondelle, Monaco, 1894, p. 73 and Crust. Décap. Travailleur et Talisman, Pt. I. 1900, p. 241.	Norway and Shetlands to C. Verde Is.: Mediterranean. Shallow water to 150 fath.
,, *excavatus*, Herbst.	*Cancer excavatus*, Herbst, Krabben, II. 1796, p. 31, pl. xxiii. fig. 8. See Henderson, *tom. cit.* p. 70 (=*P. angulatus*, Risso, Crust. Nice, 1816, p. 58, pl. i. fig 8, and *meticulosus*, Roux, Crust. Medit. 1830, pl. xliii, and *tricarinatus*, Norman, Rep. Brit. Assoc. 1868, p. 264 and Sars Norske Nordhavs Exp. Crust. p. 11, pl. i. fig. 8-10). See also Milne Edwards and Bouvier, Hirondelle Crust., Monaco 1894, p. 76. (*E. angulatus*); and Travailleur et Talisman Crust. 1900, p. 228, pl. xxvi. fig. 1-3.	Norway and Shetlands to Senegal: Mediterranean. Deep water to 220 fath.

EUPAGURUS, „ *pubescens*, Kroyer.	*P. pubescens*, Kroyer, Nat. Tidsskr. II. 1839, p. 251. See Henderson, *tom. cit.* p. 71 (= *P. thomp-soni*, Bell, Brit. Stalk-eyed Crust. 1853, p. 372, and *E. kroyeri*, Stimpson Ann. Lyc. Nat. Hist. N. Y. VII. 1862, p. 89). See also Milne Edwards & Bouvier, Hirondelle Crust. Monaco, 1894, p. 74, and T. R. R Stebbing Ann. Mag. Nat. Hist. (7) V. 1900, p. 4. [N. B. Benedict, Ann. Mag Nat. Hist. (6) XVIII. 1896, p. 99 does not admit the identity of *E. kroyeri* and *E. pubescens*.]	Arctic Seas, extending down both sides of the Atlantic, and to Puget Sound. Shallow water to 500 fath.
„ *cuanensis*, Thomps.	*P. cuanensis*, Thompson, Rep. Brit Assoc 1843, p. 267. See Henderson, *tom. cit* p. 72. Also Chevreux & Bouvier Mem. Soc. Zool. France, V. 1892, p. 97, pl. ii. fig. 16-17 (= *P. spinimanus*, Lucas, Expl. Sci. Algerie, Zool. I. Crust. 1849, p. 29, pl. iii. fig. 3 and *E. lucasi*, Heller, Crust. Südl. Europ. 1863, p. 163, pl. v. fig. 10): also Milne Edwards & Bouvier Travailleur et Talisman Crust. 1900, p. 227, pl. xxviii. fig. 19-20.	Scandinavian and British Seas to Canary Is. and Mediterranean. Shallow water to 200 fath.
„ *? forbesii*, Bell.	P. *forbesii*, Bell, Brit. Stalk-eyed Crust. 1853, p. 186. See Henderson, *tom. cit.* p. 72. *cf.* Anapagurus forbesii *infra*.	Norwegian and British Seas to 55 fath. Mediterranean.
„ *carneus*, Pocock.	Pocock, Ann. Mag. Nat. Hist. (6) IV. 1889, p. 428: Milne Edwards & Bouvier Crust. Décap. Travailleur et Talisman, pt. I. 1900, p. 252, pl. xxvii. fig. 6—10 and xxviii. fig. 17, 18.	Ireland to C. Bojador—and C. Verde? 58—740 fath.
„ *sculptimanus*, Lucas.	*P. sculptimanus*, Lucas, Expl. Sci. Algerie, Zool. I. Crust. 1849, p. 32, pl. iii. fig. 6. See Chevreux & Bouvier, Mem. Soc. Zool. France V. 1892, p. 104, pl. ii. fig. 18—20, and Milne Edwards & Bouvier, Crust. Travailleur et Talisman, p. 226.	N. W. Africa to C Verde: Mediterranean. 8—80 fath.
„ *variabilis*, E. & B.	Milne Edwards & Bouvier (1) Ann. Sci. Nat., Zool. (7) XIII. 1892, p. 217; (2) Crust. Dec. Hirondelle et Princesse Alice, Monaco 1899, p. 67; (3) Crust. Dec. Travailleur et Talisman, pt. I. 1900, p. 230, pl. xxvi. fig. 4-12: Calman, Trans. Roy. Irish Acad. xxxi. pt. I. 1896, p. 4.	Ireland to Canaries and Arguin Bank. 76—845 fath.
„ *pubescentulus*, E. & B.	Milne Edwards & Bouvier (1) p. 219: (3) p. 248, pl. xxvi. fig. 26-30, pl. xxviii. fig. 13, 14.	N. W. Africa, C. Bojador to Senegal. 62—192 fath.
„ *irregularis*, E & B.	Milne Edwards & Bouvier (1) p. 220: (3) p. 242, pl. xxvi. fig. 13—21.	N. W. Africa, C. Blanc. 65 fath.
„ *pulcheilus*, E. & B.	Milne Edwards & Bouvier (1) p. 221: (3) p. 245, pl. xxvi. fig. 22-25 and xxviii. fig. 15, 16.	C. Verde Is. 38—57 fath.
„ *ruber*, E. & B.	Milne Edwards & Bouvier, (1) p. 222: (3) p. 258, pl. xxvii. fig. 1—5.	B. of Biscay, 600 fath.

EUPAGURUS,		
,, *triangularis*, Chevr. & B.	Chevreux & Bouvier, Mem Soc. Zool. France V. 1892, p. 93, pl. ii. fig. 9-15; Milne Edwards & Bouvier, (1) p. 218: (3) p. 239.	Cape Verde.
,, *minimus*, Chevr. & B.	Chevreux & Bouvier, *tom. cit.* p. 106, pl. ii. fig. 21—26.	N. of C. Verde, 45 fath.
,, *inermis*, Chevr. & B.	Chevreux & Bouvier, *tom cit.* p. 109, pl iii. fig. 1—5.	C. Verde
,, *anachoretus*, Riss.	*Pagurus anachoretus* Risso, Hist. Nat. Europ. mérid. V. 1826, p. 41. See Bouvier, Bull. Soc. Philomath Paris (8) II. 1889-90, p. 122(= *Pagurus pictus*, Milne Edwards, Hist Nat. Crust. II. 220, and *P. annulicornis* Costa Faun Regn. Nap. p. 8. pl. vii. fig. 7. and *P. rubrovittatus*, Lucas Expl. Sci. Algerie. Zool. I. Crust. p. 31, pl. iii. fig 5, and *Clibanarius mediterraneus*, Kossmann, Arch. f. Nat. XLIV. 1878, i. p. 257.)	Mediterranean S.
,, *timidus*, Roux.	Roux, Crust. Médit. 1828, pl. xxiv. fig. 6—9. See Heller, Crust. südl. Europ., 1863, p. 165, pl. v. fig. 11 (= *Pagurus spilophthalmus*, Costa, Faun. Regn. Nap. pl. ii.)	Mediterranean S.
,, *chierighini*, Nardo.	Nardo, Annot. Crost. 1869, p. 94, pl. ii. fig. 2: Carus, Prodr. Faun. Medit. I. 493: Bouvier, Feuille des Jeunes Naturalistes, 1896. (perh. = *E. cuanensis*).	Mediterranean S.
,, *chevreuxi*, Bouv.	Bouvier, Bull. Mus. d' Hist. Nat. Paris, 1896, pp. 95—100 and fig.; and Feuille des Jeunes Nat. 1896.	Mediterranean S. (Corsica).
,, *tristanensis*, Hend.	Henderson, Challenger Anomura, p. 66, pl. vii. fig. 5.	Tristan d' Acunha (S. Atlantic) 110 fath.
CATAPAGURUS, A. M. Edw.	*ante.*	
,, *sharreri*, A. M Edw.	A. Milne Edwards, Bull. Mus. Comp Zool., Harvard, VIII. 1880, p. 46; S. I. Smith, P. U. S. Nat. Mus. VI. 1883, p. 31. pl. iv. fig. 5; Report U. S. Fish. Comm. 1884, p. 353 pl. iv. fig. 1, 2, and 1886 [p. 38]: A. Agassiz, Bull. Mus. C. Z. Harvard, XV. 1888, p. 41, fig. 235, 236: Milne Edwards and Bouvier, Mem. Mus. C. Z. Harvard, XIV. No. 3, 1893, p. 127, pl. ix. fig. 19—24. (= *Hemipagurus socialis*, S. I. Smith, P. U. S. Nat. Mus. III. 1881, p. 423, = *Catapagurus socialis*, S. I. Smith, Bull. Mus. C. Z. Harvard X. 1882, p. 16).	Western N. Atlantic, from Massachusetts to Barbados, 53—264 fath.

CATAPAGURUS, „ *gracilis*, Smith.	*Hemipagurus gracilis*, S. I. Smith, P. U. S. Nat. Mus. III 1881, p. 426. *Catapagurus gracilis*, S. I. Smith, Bull. Mus. C. Z. Harvard, X. 1882, p. 19 : P. U. S. Nat. Mus. VI. 1883, p. 33, and Rep. U. S. Fish. Comm. 1886, [p. 38] : Milne Edwards and Bouvier, Mem. Mus. C. Z. Harvard, XIV. No. 3, 1893, pl. ix. fig. 15—30.	Western N. Atlantic, from Massachusetts to Barbados, 53—155 fath.
„ „ var, *intermedius*, E. & B.	Milne Edwards and Bouvier, *Mem. cit.* p. 137, pl. ix. fig. 31—34.	W. Indies, 138—140 fath.
„ ENSIFER, Henderson.	*ante.*	Maldives and G. of Martaban.
„ *australis*, Hend.	Henderson, Challenger Anomura, 1888, p. 76, pl. viii. fig. 1.	Arafura S., 28 fath.: Fiji.
„ *doderleinii*, Dofl.	Doflein, Abh. Bayer. Akad. Wiss. XXI. iii. 1902, p. 624, pl. vi. fig. 4, 5.	Japan.
„ *diomedeæ*, Fax.	Faxon, Bull. Mus. C. Z. Harvard XXIV. 1893, p. 171; and Mem. Mus. C. Z. Harvard XVIII. No. 15, 1895, p. 57, pl. xiii. fig. 2, 2*d*.	Panama Pacific, 182 fath.
CESTOPAGURUS, Bouv.	*ante.*	
„ *coutieri*, Bouv.	Bouvier, Bull. Mus. d'Hist. Nat. 1897, p. 229.	G. of Aden.
„ OLFACIENS, Alc.	*ante.*	Maldives.

CATAPAGUROIDES.

Closely related to *Nematopagurus*, but the right vas deferens instead of ending in a filament has the form of a sabre and is curved from right to left under the base of the abdomen. Moreover, the female has no appendages on the first abdominal segment.

Catapaguroides, E. & B.	Milne Edwards and Bouvier, Ann. Sci. Nat., Zool, (7) XIII. 1892, p. 211; and Crust. Decap. Hirondelle et Princesse Alice, Monaco 1899, p. 63; and Crust, Décap. Travailleur et Talisman, Pt. I 1900, p. 206 : Bouvier, Feuille des Jeunes Nat. 1896 and Bull. Mus. d'Hist. Nat. Paris, 1900, p. 368.	
„ *microps*, E. & B.	Milne Edwards and Bouvier, *l. cc.*	E. Atlantic from Azores and C. Finisterre to Canaries, 300—1550 fath.

Catapaguroides, megalops, E. & B.	Milne Edwards and Bouvier, *l. cc.*	E. Atlantic, Azores and Morocco, 110—345 fath.
„ *acutifrons,* E. & B.	Milne Edwards and Bouvier, *l. cc.* (1 & 3.)	E. Atlantic, Canary Is., 16½—650 fath.

ANAPAGURUS, Hend. *ante.*

„ *acutus,* E. & B.	Milne Edwards & Bouvier, Mem. Mus. Comp. Zool. Harvard, XIV. No. 3, 1893, p. 120. pl. ix. fig. 7—13, (possibly = *A. pusillus* Hend. and *A. chiroacanthus* Lillj.)	G. of Mexico, 229—152 fath.
„ *marginatus,* E. & B.	Milne Edwards & Bouvier, *op. cit.*, p. 123, pl. ix. fig. 14—18.	Barbados, 73 fath.
„ *chiroacanthus,* Lillj.	*Pagurus chiroacanthus*, Lilljeborg, Ofv. K. Vet. Akad. Forhandl. (1855) 1856. *Eupagurus chiroacanthus*, Meinert, Naturhist. Tidsskr. 1877, p. 218. *Spiropagurus chiroacanthus*, G. O. Sars, Arch. Math. o Naturvid. XIII. 1889-90, p. 155, pl. iii. *Anapagurus chiroacanthus*, Henderson, Challenger Anomura, p. 73: Bouvier, Feuille des Jeunes Naturalistes, 1896 (= *Anapagurus ferrugineus*, Henderson, Proc. Roy. Phys. Soc. Edinb. IX. 1885-88, p. 75 = *Pagurus ferrugineus*, Norman, Ann. Mag. Nat. Hist. (3) VIII. 1861, p. 273, pl. xiii. fig. 1—3.)	Scandinavian and British Seas to about 272 fath.
„ *hyndmanni,* Thomps.	*Pagurus hyndmanni*, Thompson, Rep. Brit. Assocn. 1843, p. 267: Bell, Brit. Stalk-eyed Crust. p. 182: *Anapagurus hyndmanni*, Henderson, Proc. Roy. Phys. Soc. Edinb. IX. 1885-88, p. 74: Bouvier, Feuille des Jeunes Nat. 1896	British Seas
„ *laevis,* Thomps.	*Pagurus laevis*, Thompson, *loc. cit.*; Bell, *op. cit.*, p. 184: Norman, Ann. Mag. Nat. Hist. (3) VIII. 1861, pl. xiii. fig. 4: Sars, Forh. Selsk. Vidensk, Christiania, 1873 p. 86. *Eupagurus laevis*, Meinert, Naturhist. Tidsskr. Copenhag. 1877, p. 217: Carus, Prodr. Faun. Medit. I. p. 493. *Anapagurus laevis*, Henderson, Proc. Roy. Phys. Soc. Edinb. IX. 1885-88, p. 74: Milne Edwards & Bouvier, Ann. Sci. Nat. Zool. XIII. 1892, p. 214; and Crust. Décap. Hirondelle, Monaco, 1894, p. 72, pl. xi. fig. 16—28; and Crust. Décap. Travailleur et Talisman, Pt. I. 1900, p. 217, pl. xxviii. fig. 9, 10: Chevreux & Bouvier, Mem. Soc. Zool. France, 1892, p. 90: Bouvier, Feuille des Jeunes Nat. 1896: Allen, Journ. Marine Biol. Assoc. V. 1899, p. 488: Ohlin, Bihang Svensk. Vet. Akad. Handl. XXVII. iv. 8, 1901, p. 22.	Scandinavian and British Seas, Mediterranean Sea, Eastern N. Atlantic as far south as Senegal: down to about 380 fath.

ANAPAGURUS, *? forbesii*, Bell.	*Pagurus forbesii*, Bell, Brit. Stalk-eyed Crust. p. 186; *Spiropagurus forbesii*, G. O. Sars, Arch. Math. o. Naturvid., 1889-90, p. 161: *Eupagurus forbesii*, Carus, Prodr. Faun. Medit. I. 492. *Anapagurus forbesii*, Bouvier, Feuille des Jeunes Nat. 1896.	Scandinavian and British Seas. Mediterranean.
„ *curvidactylus*, Chev. & Bouv.	Chevreux & Bouvier, Bull. Soc. Zool. France 1891, p. 253, and Mem. Soc. Zool. France, 1892, p. 91, pl. ii. fig. 2—8; Milne Edwards & Bouvier Crust. Décap. Travailleur et Talisman, Pt. I. 1900, p. 225: Bouvier, Feuille des Jeunes Nat. 1896.	Eastern N. Atlantic, B. of Biscay to Senegambia: to about 110 fath.
„ *brevicarpus*, E. & B.	Milne Edwards & Bouvier, Ann. Sci. Nat., Zool., (7) XIII. 1892, p. 215; and Crust. Décap. Hirondelle et Princesse Alice, Monaco, 1899, p. 67; and Crust. Décap. Travailleur et Talisman, Pt. I. 1900, p. 223, pl. xxv. fig. 23—26, pl. xxviii. fig. 11; and Bouvier, Feuille des Jeunes Nat. 1896.	B. of Biscay to Senegal; to about 125 fath.
„ *bicorniger*, E. & B.	Milne Edwards & Bouvier, Ann. Sci. Nat., Zool., 1892, p. 215: Crust. Décap. Hirondelle etc. Monaco, 1899, p. 66: Crust. Décap. Travailleur etc. p. 220, pl. xxv. fig. 14-22: Bouvier, Feuille des Jeunes Nat. 1896.	C. St. Vincent, 53—64 fath. W. Mediterranean, 38 fath.
„ *? dubius* E. & B.	Milne Edwards & Bouvier, Bull. Mus. d'Hist. Nat. Paris, 1898, p. 234; and Crust. Décap. Travailleur et Talisman, Crust. Pt. I. 1900, p. 215, pl. xxviii. fig. 1—8.	C. Verde Is., 122 fath.
„ *pusillus*, Hend.	Henderson, Challenger Anomura, 1888, p. 73, pl. vii. fig. 7.	E. Atlantic, Azores to Cape Colony; 90—18 fath.
„ „ var. *japonicus* Ortm.	Ortmann, Zool. Jahrb., Syst. VI. 1891-92, p. 296, pl. xii. fig. 11.	Japan, to 40 fath.
„ *australiensis*, Hend.	Henderson, Challenger Anomura, 1888, p. 74, pl. vii. fig. 8.	Port Jackson, N. S. Wales: 2 to 10 fath.
(?)„ sp. indet	*Ante.*	Maldive Is.
SPIROPAGURUS, Stimpson.	*Ante.*	
„ SPIRIGER, DeHaan.	*Ante.*	B. of Bengal to Japan down to 49 fath.
„ „ var. PROFUNDORUM.	*Ante.*	Indian Seas, 35—824 fath.

SPIROPAGURUS SPIRIGER var. LOPHOMERIS.	*Ante.*	Andaman S., 20 fath.
„ „ var. SPINOSICARPIS.	*Ante.*	Indian Seas.
„ *occidentalis*, Fax.	Faxon, Bull. Mus. Comp. Zool., Harvard, XXIV. 1893, p. 172; and Mem. Mus. Comp. Zool. Harvard, XVIII. No. 15, 1895, p. 59, pl. xiv. fig. 1.	Panama-Pacific, 52—66 fath.
„ *dispar*, Stimps.	Stimpson, Ann. Lyc. Nat. Hist., N. York, VII. 1862, p. 88: Milne Edwards & Bouvier, Mem. Mus. C. Z. Harvard, XIV. No. 3, 1893, p. 118, pl. ix. fig. 1—6.	Barbados, to 100 fath.
„ *iris*, A. M. Edw.	A. Milne Edwards, Bull. Mus. C. Z., Harvard, VIII. 1880, p. 44; and Milne Edwards & Bouvier, *op. cit.* p. 112, pl. viii. fig. 14—25	W. Indies, 73—103 fath.
„ *caribbensis*, E & B.	Milne Edwards & Bouvier, *op. cit.* p. 116, pl. viii. fig. 26—30.	Caribbean S., 27 fath.
„ *elegans*, Miers.	Miers, Ann. Mag. Nat. Hist. (5) VIII. 1881, p. 278, pl. xvi. fig. 5: Henderson, Challenger Anomura, p. 73: Chevreux & Bouvier, Mem. Soc. Zool. France, 1892, p. 89, pl. ii. fig. 1.	Senegambia and Canaries, to 78 fath.

MUNIDOPAGURUS.

Munidopagurus resembles *Pylopagurops is* in the number and disposition of the branchiæ and in the presence, in the female, of a pair of appendages to the 1st abdominal segment; it differs in having a symmetrical tail-fan, and the 4th pair of thoracic legs not subcheliform: moreover the fingers move in a horizontal plane, as in *Eupagurus*.

Munidopagurus, E. & B.	Milne Edwards & Bouvier, Mem. Mus. Comp. Zool., Harvard, XIV. No. 3, 1893, p 102.	
„ *macrocheles*, A. M. E.	Milne Edwards & Bouvier, *tom. cit.* p. 103, pl. vii. fig. 21—26. (= *Eupagurus macrocheles*, A. Milne Edwards, Bull. Mus. Comp. Zool. Harvard VIII. 1880, p. 40.)	G. of Mexico, 175 fath.
PYLOPAGUROPSIS, Alc.	*Ante.*	
„ MAGNIMANUS, Hend.	*Ante.*	B. of Bengal, 65—217 fath.

PYLOPAGURUS.

Appears to agree with *Pylopaguropsis* in all particulars except the following :— (1) there are only 11 gill-plumes on either side, instead of 13 ; and (2) the enlarged right hand is usually bent downwards at an angle with the wrist.

Pylopagurus, E. & B.	Milne Edwards and Bouvier, Bull. Soc. Philomath. Paris (8) III. 1891, p. 108; and Mem. Mus. C. Z. Harvard XIV. No. 3, 1893, p. 74: Faxon, Mem. Mus. C. Z. Harvard XVIII. No. 15, 1895, p. 61.	
„ *discoidalis*, A. M. E.	Milne Edwards and Bouvier, Mem. Mus. C. Z. Harvard, XIV. No. 3, 1893, p. 76, pl. vi. fig 7—14 (=*Eupagurus discoidalis* A. Milne Edwards, Bull. Mus. C. Z. Harvard, VIII. 1880, p. 41).	W. Indies, 54–508 fath.
„ *ungulatus*, Studer.	Milne Edwards and Bouvier, *op. cit.*, p. 80, pl. vi. fig. 15—18 (=*Eupagurus ungulatus*, Studer, Abh. k. Akad. Berlin [1882] 1883, p. 26, pl. ii. fig. 13 *a-c.*)	C. of Good Hope, 50 fath. Caribbean S., 20 fath.
„ *boletifer*, E & B.	Milne Edwards and Bouvier, *op. cit.*, p. 84, pl. vi. fig. 19—22.	W. Indies, 115 fath.
„ *alexandri*, E. & B.	Milne Edwards and Bouvier, *op. cit.*, p. 87, pl. vi. fig. 23–26.	W. Indies, 76—115 fath.
„ *erosus*, A. M. E.	Milne Edwards and Bouvier, *op. cit.*, p. 89, pl. vi. fig. 27—30 (=*Eupagurus erosus*, A. M. Edw., *tom. cit.* p. 42).	W. Indies, 73—210 fath.
„ *bartletti*, A. M. E.	Milne Edwards and Bouvier, *op. cit.*, p. 91, pl vii. fig. 1—9 (=*Eupagurus bartletti*, A. M. Edw., *tom. cit.* p. 41).	W. Indies, 82—209 fath.
„ *rosaceus*, E & B.	Milne Edwards and Bouvier, *op. cit.*, p. 97, pl. vii. fig. 10—17.	W. Indies, 92 fath
„ *gibbosimanus*, A. M. E.	Milne Edwards and Bouvier, *op. cit.*, p. 99, pl. vii. fig 18–20 (=*Eupagurus gibbosimanus*, A. M. Edw., *tom. cit.* p. 42.)	W. Indies, 124—270 fath.
„ *longimanus*, Fax.	Faxon, Bull. Mus. Comp. Zool. Harvard, XXIV. 1893. p. 168, and Mem. Mus. C. Z. Harvard, XVIII. No. 15, 1895, p. 61, pl. xii. fig. 1—1*e*.	Cocos I. (Pacific Panama) 66 fms.
„ *affinis*, Fax.	Faxon, *Bull. cit.* p. 169; *Mem. cit.*, p. 64, pl. xii. fig. 2, 2*e*.	G. of Panama, 85 fath.

Pylopagurus, hirtimanus, Fax.	Faxon, *Bull. cit.* p. 170; *Mem. cit.*, p. 65, pl. xiii. fig. 1, 1*e*.	Cocos I. (Pacific Panama) 66—100 fath.
TOMOPAGUROPSIS, Alc.	*Ante.*	
„ LANATA, Alc.	*Ante.*	Of W. coast Travancore and Ceylon, 142—400 fath.
„ *problematica,* E. & B.	*Eupagurus? problematicus,* A. Milne Edwards and Bouvier, Mem. Mus. Comp. Zool. Harvard, XIV. No. 3, 1893, p. 151, pl. xi. fig. 1—10.	West Indies, 125—188 fath.

TOMOPAGURUS.

Tomopagurus agrees with *Tomopaguropsis*, in that the male is furnished with a pair of appendages to the first abdominal somite, but differs in the number of the gills and in the form of the gill-filaments. (See p. 136.)

Tomopagurus, E. & B.	Milne Edwards and Bouvier, Mem. Mus. C. Z. Harvard, XIV. No. 3, 1893, p. 70.	
„ *rubrofunctatus,* E. & B.	Milne Edwards and Bouvier, *op. cit.* p. 71, pl. vi. fig. 1—6.	W. Indies, 73 fath.

XYLOPAGURUS.

Xylopagurus is related to *Eupagurus*, but the abdomen, not having to conform to the rigid curve of a shell, has acquired a secondary symmetry and is carried straight. In the male the first two abdominal somites have each a pair of appendages. Otherwise the characters seem to be those of *Eupagurus*, though the penultimate segment of the abdomen is specially modified to form a shield to close the posterior opening of the tube in which the animal lives.

Xylopagurus, A. M. E.	A. Milne Edwards, Bull. Mus. Comp. Zool., Harvard, VIII. 1880, p. 37: Milne Edwards and Bouvier, Mem. Mus. Comp. Zool. Harvard, XIV. No. 3, 1893, p. 106.	
„ *rectus,* A. M. E.	A. Milne Edwards, *loc. cit.*: Milne Edwards and Bouvier *op. cit.* p. 108, pl. viii. fig. 1—13: A. Agassiz, Three Cruises of the Blake, Bull. Mus. Comp. Zool., Harvard, XV. p. 40, fig. 233, 234: J. E. Benedict, Bull. U. S. Fish. Comm. XX (2) p. 143.	West Indies, 138—146 fath.

TYLASPIS.

Tylaspis, the type of which, in the British Museum, I have examined, belongs to the subfamily *Eupagurinæ*, and seems to have a place near *Sympagurus*. Like *Paguropsis* among the *Paguriuæ* the body has regained a kind of symmetry, owing to the fact that it is not required to adapt itself to a rigid spiral tenement. The carapace is broad and subcalcareous, and the abdomen small.

Tylaspis, Hend.	Henderson, Challenger Anomura, 1888, pp. 52, 81.	
,, *anomala*, Hend.	Henderson, *op. cit.*, p. 81, pl. viii. fig. 5.	Mid. S. Pacific, 2375 fath.

OSTRACONOTUS.

The carapace is broad and entirely coriaceous, and the abdomen is rudimentary. The 4th and 5th pairs of thoracic legs are monodactylous. The branchiæ are reduced to 10 on either side, pleurobranchiæ being entirely absent.

Ostraconotus, A. M. E.	A. Milne Edwards, Bull. Mus. Comp. Zool. Harvard, VIII. 1880, p. 45: Milne Edwards and Bouvier Mem. Mus. Comp. Zool., Harvard, XIV. No. 3, 1893, p. 167.	
,, *spatulipes*, A. M. E.	A. Milne Edwards, *loc. cit.*: A. Agassiz, Bull. Mus. Comp. Zool., Harvard, XV. p. 42: Milne Edwards and Bouvier, *tom. cit.*, p. 169, pl. xii.	West Indies and G. of Mexico, 119—140 fath.

PORCELLANOPAGURUS.

Porcellanopagurus, Filhol.	Filhol, Bull. Soc. Philomath. Paris (7) IX. 1884-85, p. 48; and in Crust. Nouv. Zélande, in Mission de l'île Campbell, III ii. 1, p. 410, pl. xlix: Thomson, Trans. N. Z. Inst., 1898, p. 187.	
,, *edwardsi*, Filh.	Filhol. *l.cc.*: Thomson, *l.c.*	New Zealand.
,, *tridentatus*, Whitel.	Whitelegge, Mem. Austral. Mus., IV., Pt. 2, 1900, p. 181, figs. 13, *a—b*.	Off coast N. S. Wales, 54—59 fath.
,, *plotei*. Lenz.	Lenz, in Fauna Chilensis, Zool. Jahrb., Suppl. Band, V. ii. p. 740, pl. xxiii. fig. 2.	Juan Fernandez.

Family COENOBITIDAE.

COENOBITA, Latr.	*Ante.*	
„ CLYPEATUS, Latr.	*Ante.*	W. Africa ; E. Africa to Tahiti.
„ RUGOSUS, Edw.	*Ante.*	W. Africa: E Africa to Pacific shores of America.
„ „ var. *granulatus*, Bouv.	Bouvier, Bull. Soc. Philom. Paris (8) II., 1889-90, p. 146.	Madagascar. Pellew Is., Sandwich Is.
„ „ var. *jousseaumi*, Bouv.	Bouvier, *loc. cit.*	Vicinity of Aden.
„ „ var. *wagneri*, Dofl.	Doflein. SB. K. Akad. München, 1900, p. 134.	Pacific ; Panama.
„ *compressus*, Guérin.	Guérin, Voy. Coquille, II., 1830, Crust., p. 29 : Milne Edwards, Hist. Nat. Crust., II., 1837, p. 241 : De Haan, Faun. Japon. Crust., p. 213 : Bouvier, Bull. Soc. Philom. (8) III., 1890-91, p. 21 (see also Bull. Soc. Philom. (8) II., 1889-90, p. 147) : Faxon, Mem. Mus. Comp. Zool., XVIII., No. 15, p. 52.	E. Africa to Pacific shores of America.
„ PERLATUS	*Ante.*	Mauritius to Samoa.
„ „ var, *affinis*, Miers.	Miers, Ann. Mag. Nat. Hist. (5) V., 1880, p. 372, pl. xiv. fig. 8.	Batjan (Moluccas).
„ „ var. *purpurea*, Stimps.	Stimpson, Proc. Ac. Nat. Sci. Philad. (1858), 1859, p. 245 : Bouvier, Bull. Soc. Philom. (8) II., 1889-90, p. 148.	Bonin, Amakirrima.
„ CAVIPES, Stimps.	*Ante.*	E. Africa to Liu Kiu Is.
„ *spinosus*, Edw.	Milne Edwards, Hist. Nat. Crust., II., 1837, p. 242 : A. Milne Edwards, Nouv. Archiv. du Mus., IV., 1868, p. 72 : Bouvier, Bull. Soc. Philom. (8) II., 1889-90, p. 144 ; Ortmann, Zool. Jahrb., Syst., 1892, p. 318, pl. xii. fig. 24 : Borradaile, P. Z. S., 1898, p. 459 ; and Stom. and Macr. Willey's Exp., p. 425. *C. brunnea*, Dana, U. S. Expl. Exp., Crust., pt. I., p. 470, pl. xxix. fig. 10 *a—b.* : Haswell, Cat. Austral. Crust., p. 161. *Birgus hirsutus*, Hess, Archiv f. Nat., 1865, p. 162, pl. vii. fig. 16	E. Africa to Polynesia.

COENOBITA, „ *olivieri*, Owen.	Owen, Zool. "Blossom," 1839, p. 84 (*ubi syn.*): Dana, *op. cit.*, p. 470: ? Heller, Novara Crust., p. 82: Streets, Bull. U. S. Nat. Mus., VII., 1877, p. 117: Haswell, Cat. Austral. Crust., p. 160: Bouvier, Bull. Soc. Philom. (8) II., 1889-90, p. 144; Whitelegge, Mem. Austral. Mus., III., 1897, p. 140: Lanchester, Ann. Mag. Nat. Hist. (Ortmann, *loc. cit.* regards this species as a variety of *C. spinosus*, Edw.)	Nicobars (?) to Polynesia.
„ *carnescens*, Dana.	Dana, Proc. Ac. Nat. Sci. Philad., 1851 (1852), p. 272, and U. S. Expl. Exp., etc., p. 472, pl. xxx. fig. 3 *a—b* (Regarded by Bouvier, *loc. cit.*, as probably a variety of *C. compressus*).	E. Polynesia.
„ *longitarsis*, deMan.	de Man, Abh. Senckenb. Nat. Ges., XXV., 1902, p. 746, pl. xxiv. fig. 47.	E. Indian Archipel.
„ *panamensis*, Streets.	Streets, Proc. Ac. Nat. Sci. Philad., 1871, p. 241; and Bull. U. S. Nat. Mus., VII., 1877 p. 117 (=*C. intermedius*, Streets *l. c.*): Bouvier, *l. c.*, p. 150. (Regarded by Bouvier as a variety of *C. perlatus*.)	Pacific coast of Central America.
„ *diogenes*, Catesby.	Milne Edwards, Hist. Nat. Crust., II., 1837, p. 240, pl. xx. fig. 11—14; Bouvier, Bull. Soc. Philom. (8) II., 1889-90, p. 143: Ortmann, Zool. Jahrb., Syst., 1892, p. 316. pl. xii. fig. 21: Nobili, Bull. Mus. Torino, 1897, No. 280, p. 3: Rathbun, Ann. Inst. Jamaica, 1897, p. 42: Doflein, SB. Bayer. Akad., 1899, p. 186, and 1900, p. 133 [=*Cancer clypeatus*, Herbst: *Pagurus clypeatus*, Fabr.].	Brazil, W. Indies, etc., Florida, Bermuda.
„ *rubescens*, Greff.	Greff, Beford. Nat. Marburg, 1884, No. 2, p. 53: Ozorio, Jorn. Sci Lisb., 1887, p. 222: Rathbun, P. U. S. N. M., 1900, p. 301.	W. Africa.

N. B.—*Coenobita baltzeri*, Neumann, Cat. Crust. Heidelb. Mus., 1878, p. 32, seems to be identical with the species here called *C. cavipes*, Stimpson; and *Coenobita subrugosus*, Neumann, *ibid.* is perhaps the same as *C. compressus*, Guérin.

BIRGUS Leach.	*Ante.*	
„ LATRO, Linn.	*Ante.*	Tropical Indo-Pacific.

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ANOMURA.

PLATES I—XVI.

EXPLANATION OF PLATE I

Fig. 1. Parapylocheles scorpio : x 2

„ 1*a*. „ „ anterior end : x 4

„ 1*b*. „ „ tail fan : x 4

„ 2. Pylocheles Miersii : x 2

„ 2*a*. „ „ in tube of bamboo : x 2

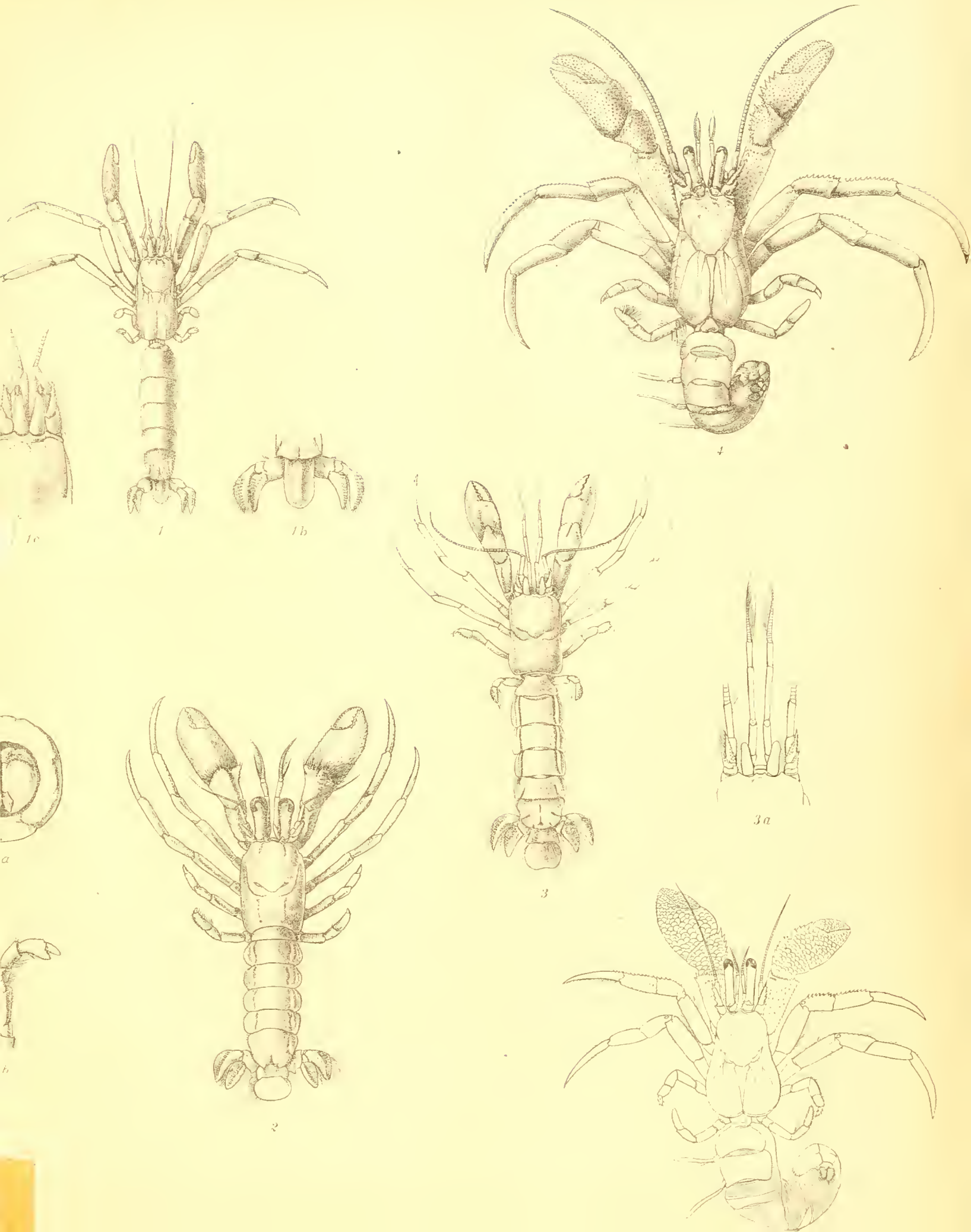
„ 2*b*. „ „ external maxilliped : x 4

„ 3. Chiroplatæa Macgilchristi : x 1½

„ 3*a*. „ „ anterior end : x 3

„ 4. Paguristes calvus : x 1½

„ 5. Paguristes longirostris : x 2



EXPLANATION OF PLATE II

Fig. 1. Paguropsis typica : male, with abdominal appendages on the right side : × 1½

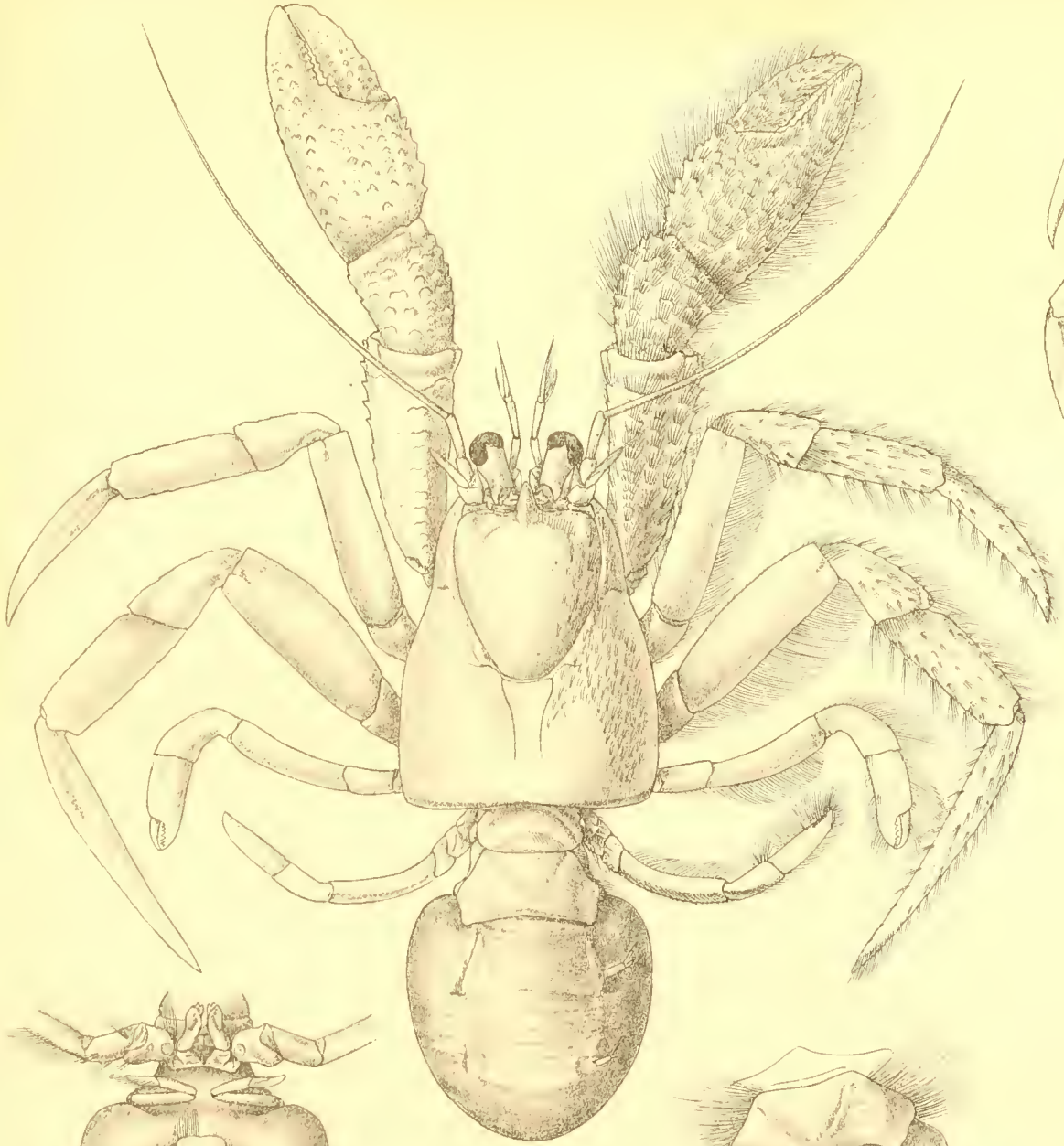
„ 1*a*. Paguropsis typica : male, ventral view of abdomen : × 1½

„ 1*b*. Paguropsis typica : male, abdomen with appendages on the left side : × 1½

„ 2. Paguropsis typica ; female, with abdominal appendages and brood-pouch on the right side : × 1½

„ 2*a*, 2*b*. Paguropsis typica : female, abdomen with appendages and brood-pouch on the left side.

„ 3. Paguropsis typica : specimen clothed in its coat of sea-anemones : × 1½



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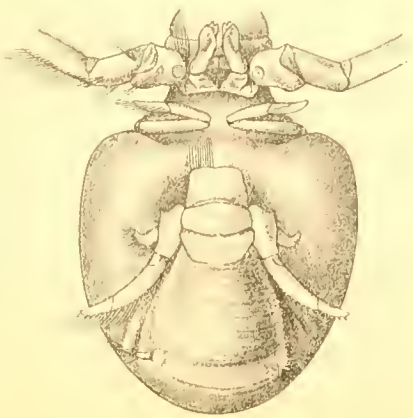
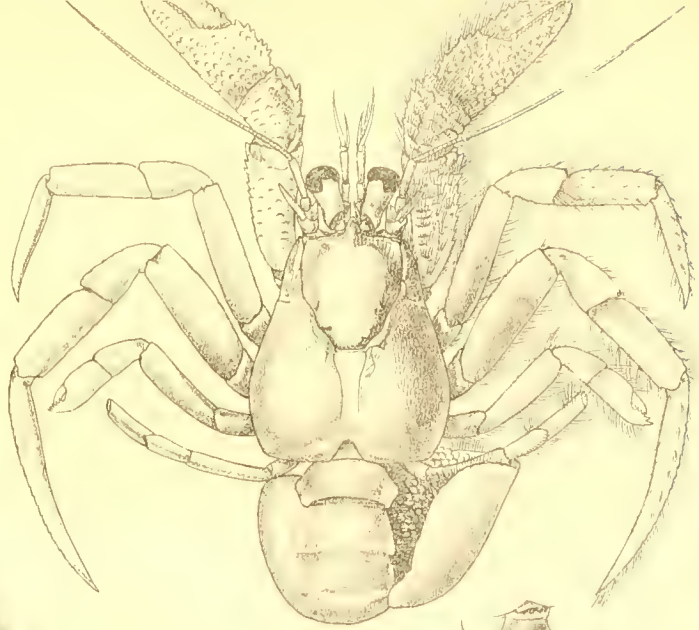


1a

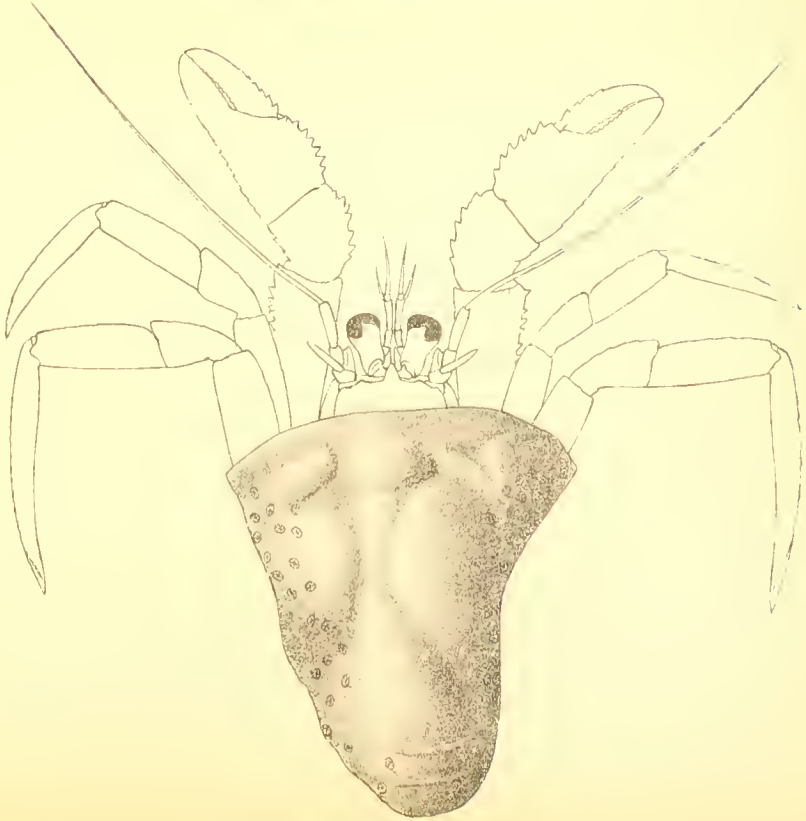
1b



2

2a

2b



EXPLANATION OF PLATE III

Fig. 1. Paguristes balanophilus : x 1½

„ 2. Paguristes hians : x 4

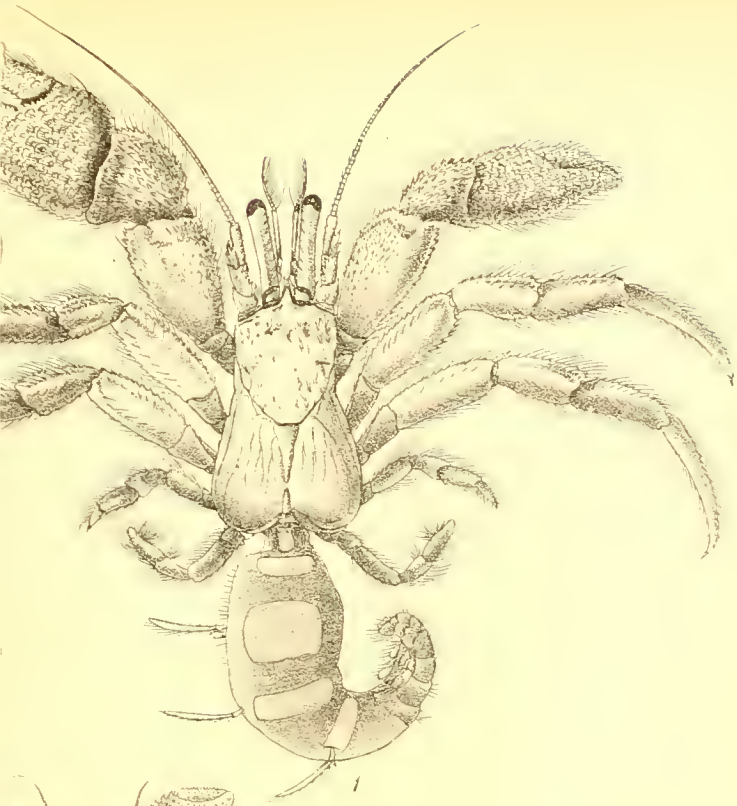
„ 3. Paguristes pusillus : x 3

„ 4. Paguristes incomitatus : x 4

„ 5. Paguristes mundus ; x 3

„ 6. Paguristes puniceus : natural size.

„ 6*a*. „ „ to show the juxtaposed external maxillipeds.



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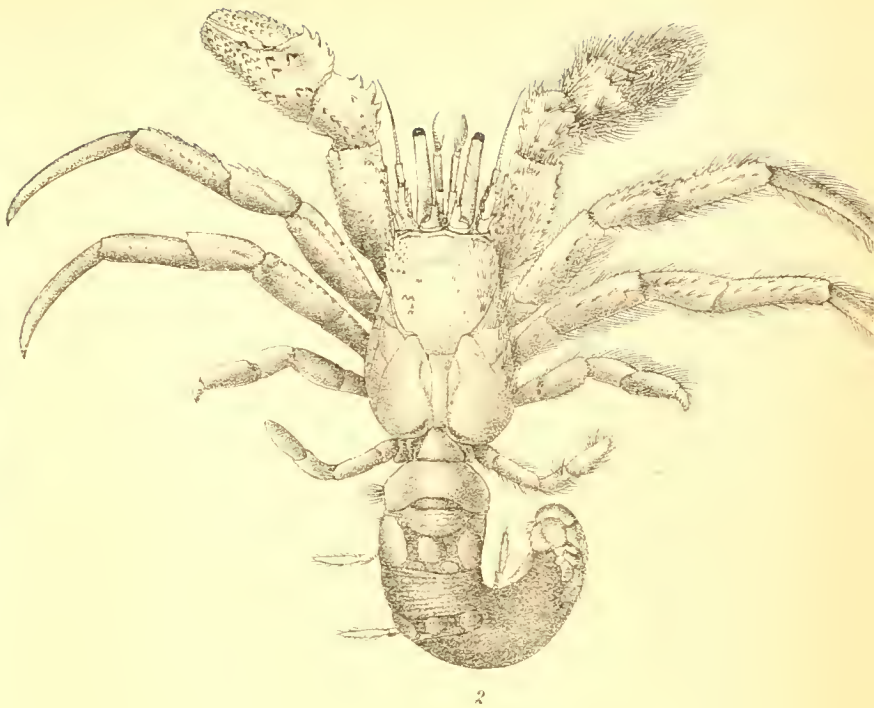

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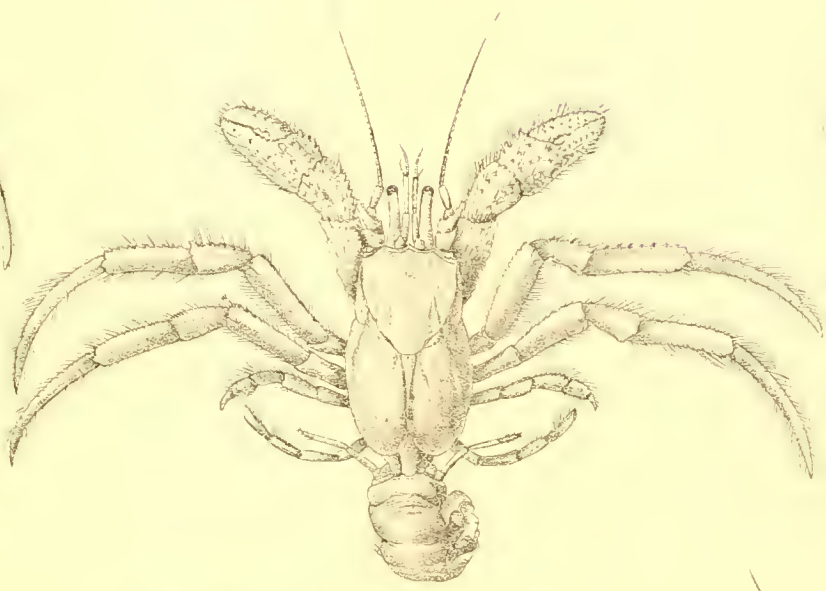

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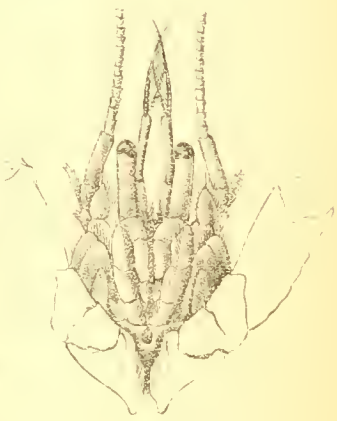
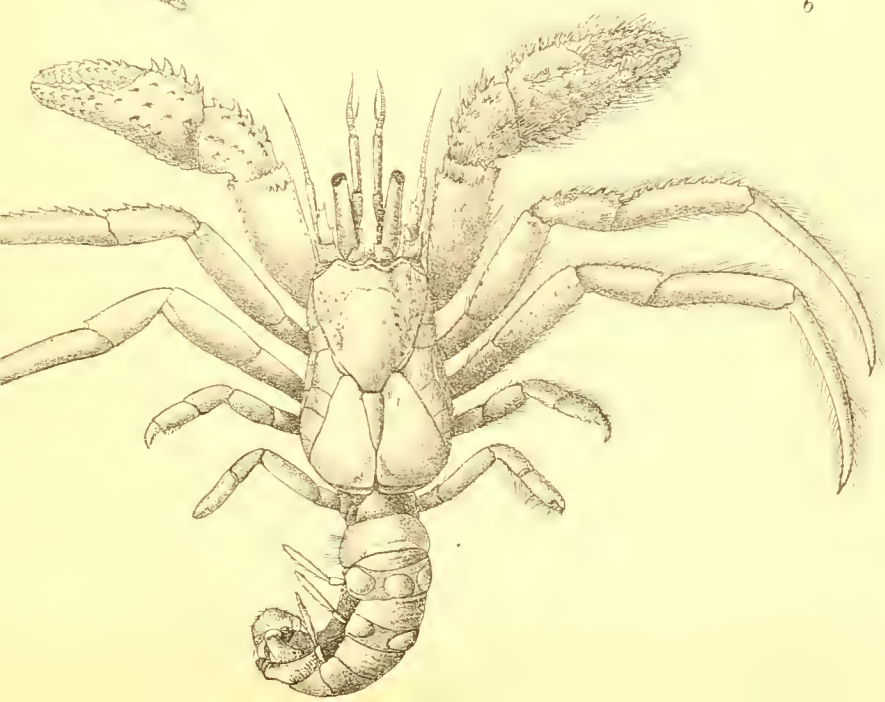
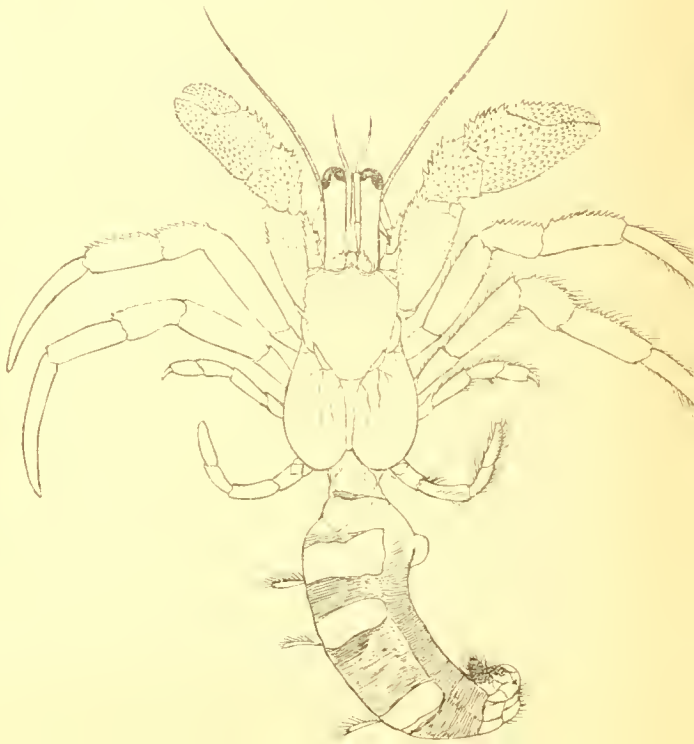


6a





EXPLANATION OF PLATE IV

Fig. 1. Clibanarius clibanarius : natural size.

„ 1*a*. „ „ enlarged.

„ 2. Clibanarius padavensis : × 1½

„ 3. Clibanarius arethusa : natural size.

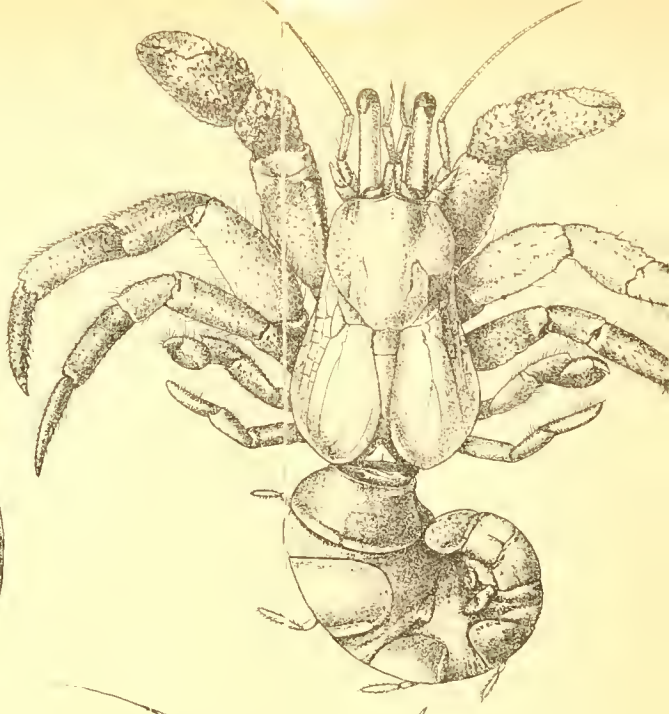
„ 4. Clibanarius albicinctus : × 3

„ 5. Clibanarius merguiensis : × 3

„ 6. Clibanarius humilis : × 3

„ 7. Clibanarius striolatus : × 1½

1



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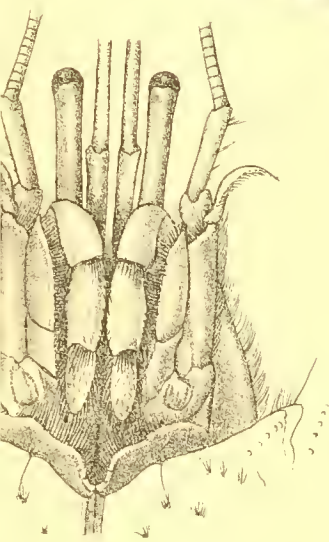

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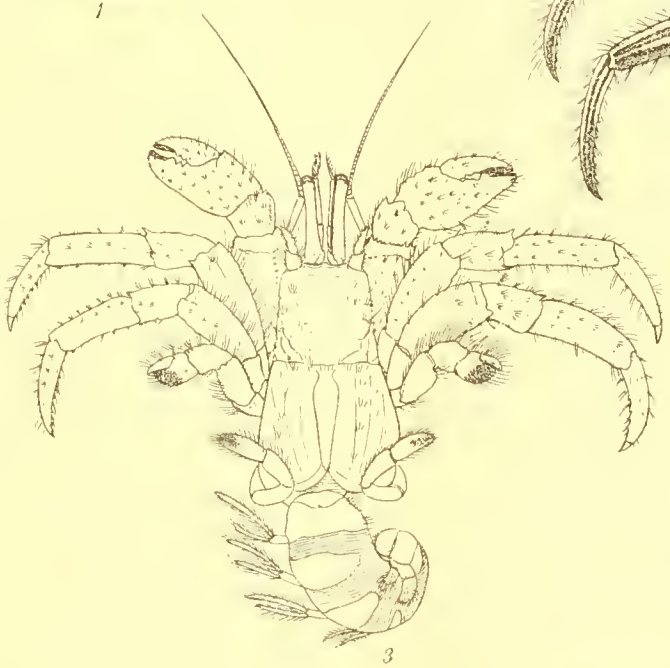

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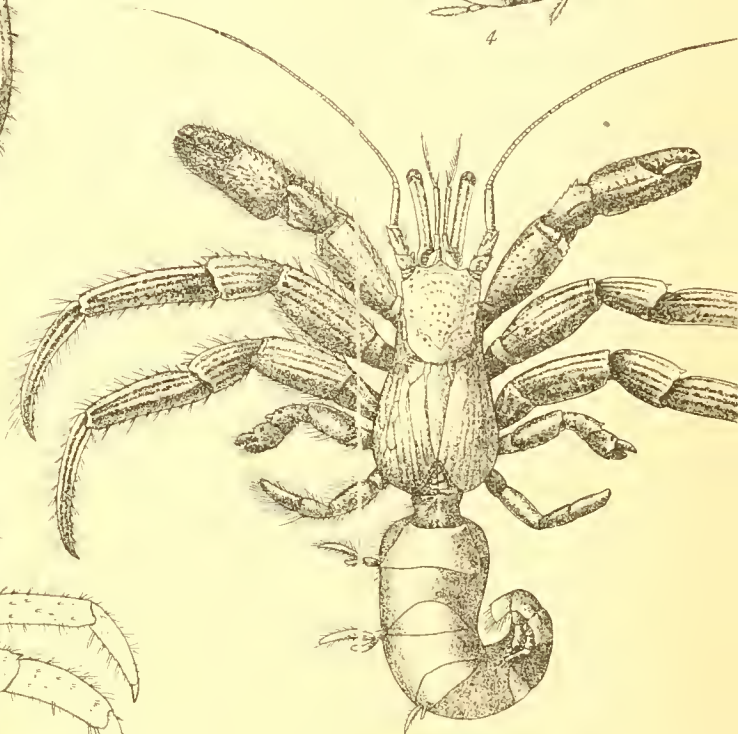
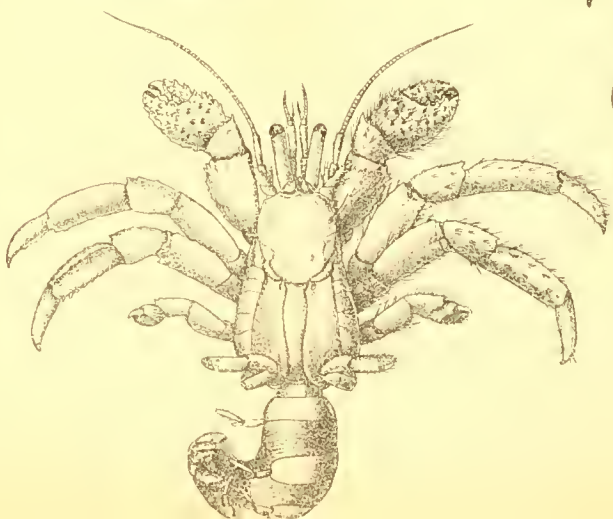
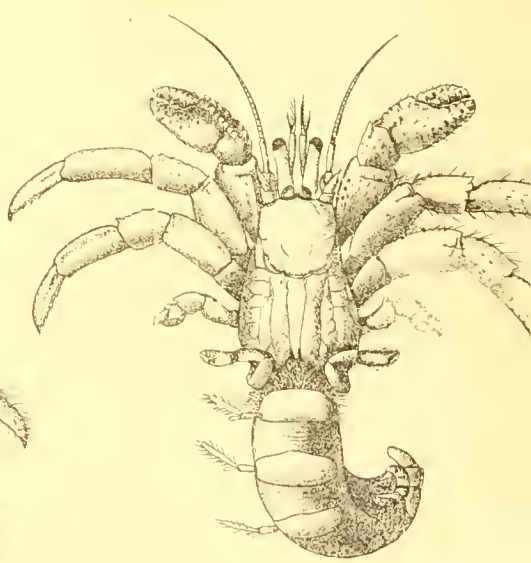


2

7





EXPLANATION OF PLATE V

Fig. 1. Clibanarius corallinus : natural size.

„ 2. Calcinus elegans : × 2

„ 3. Calcinus gaimardi : × 1½

„ 4. Calcinus herbstii : × 1½

„ 4*a*. „ „ × 2

„ 5. Calcinus latens (left hand) : × 4

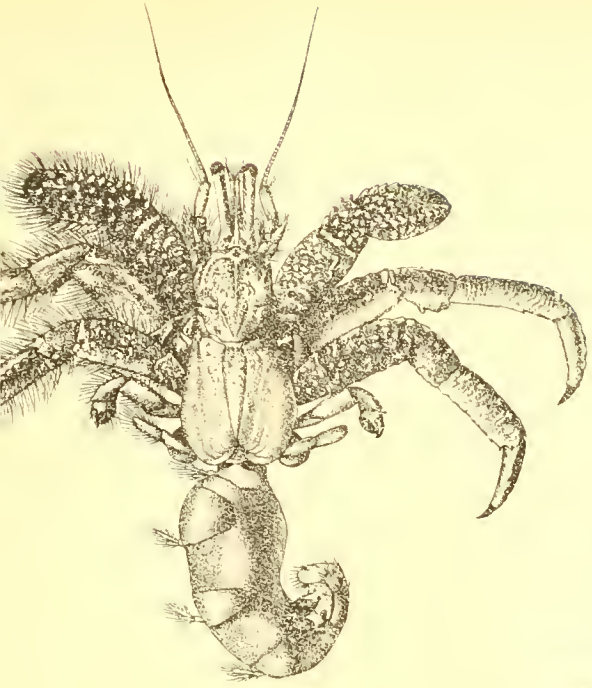
„ 6. Troglopagurus jousseaumii : × 2

„ 6*a*. „ „ × 4

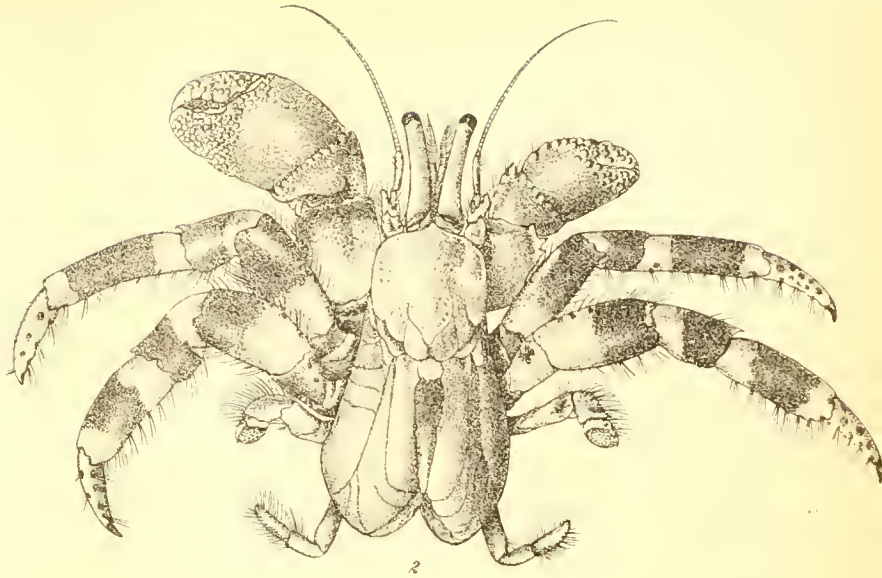
„ 7. Calcinus terræ-reginæ : × 2⅔

„ 8. Cancellus investigatoris, male : × 3

„ 8*a*. „ „ „ × 3



1



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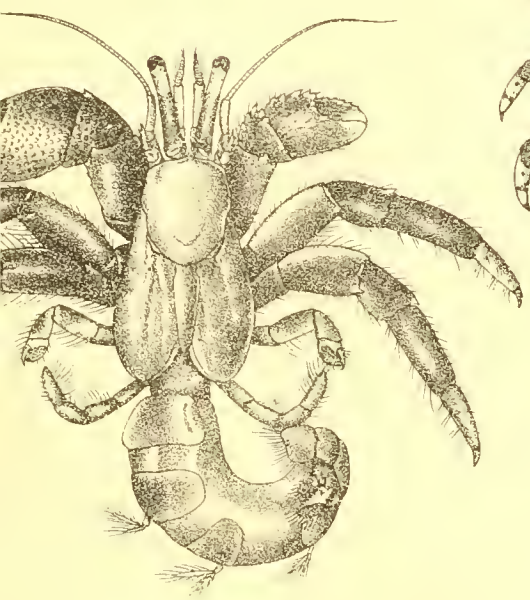

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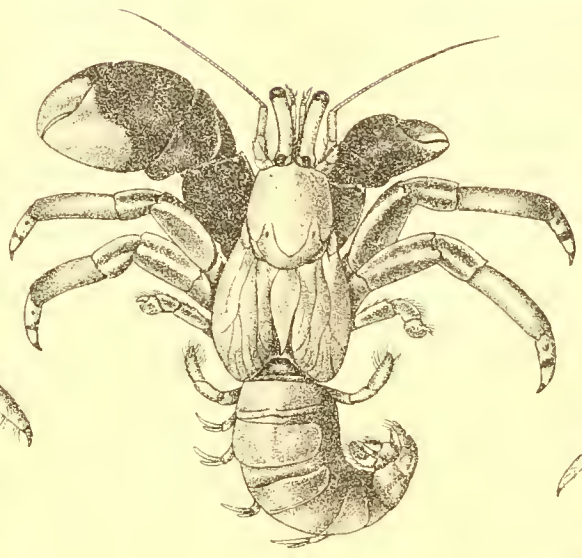

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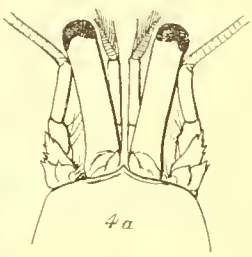
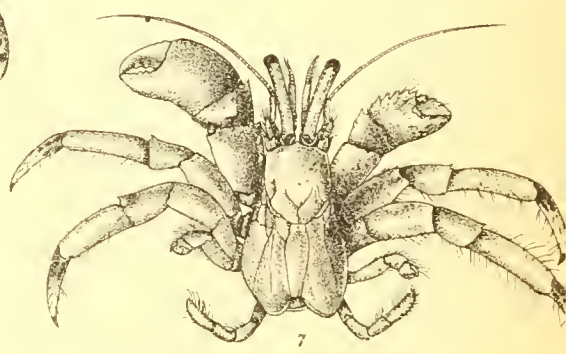


4a

5



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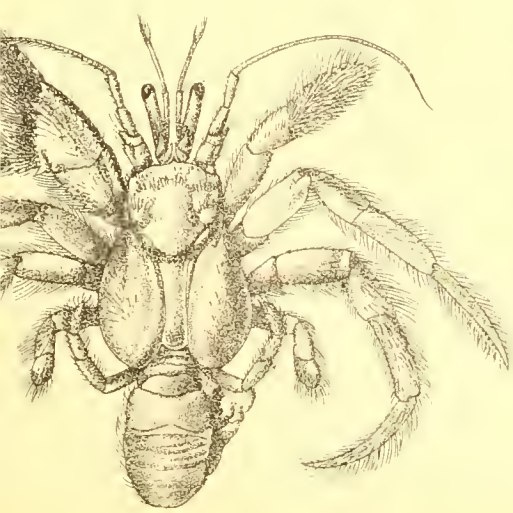

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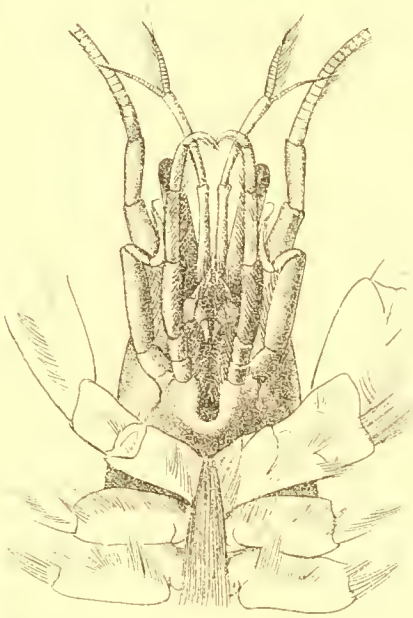

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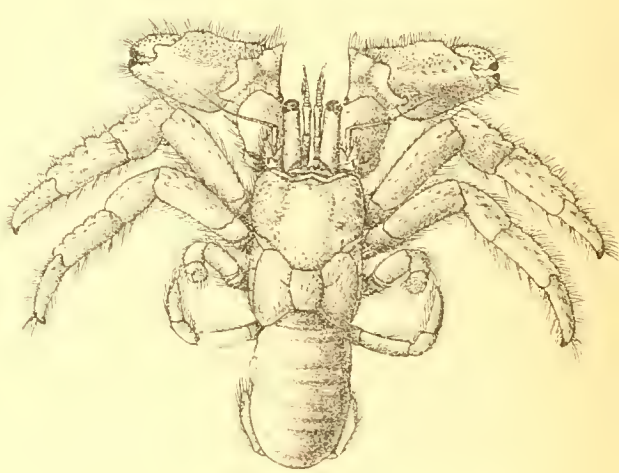

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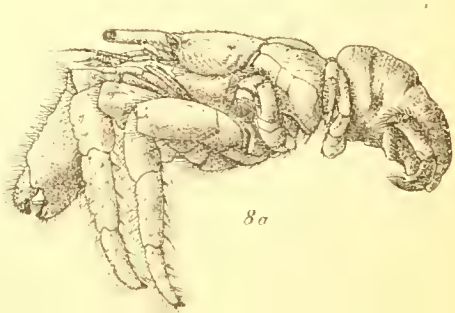


8a

EXPLANATION OF PLATE VI

Fig. 1. Diogenes custos Fabr.: natural size.

„ 1*a*. „ „ „ anterior end: × 2

„ 2. Diogenes custos Fabr. *var.* affinis: natural size.

„ 2*a*. „ „ „ „ „ × 2

„ 3. Diogenes custos Fabr. *var.* planimanus: natural size.

„ 3*a*. „ „ „ „ „ × 3

„ 4. Diogenes custos Fabr. *var.* violaceus: × 2

„ 4*a*. „ „ „ „ „ × 4

„ 5. Diogenes miles Herbst: natural size.

„ 5*a*. „ „ „ × 3

„ 6. Diogenes avarus, adult male: × 2

„ 6*a*. „ „ „ „ × 4

„ 7. Diogenes costatus: × 1½

„ 7*a*. „ „ × 4

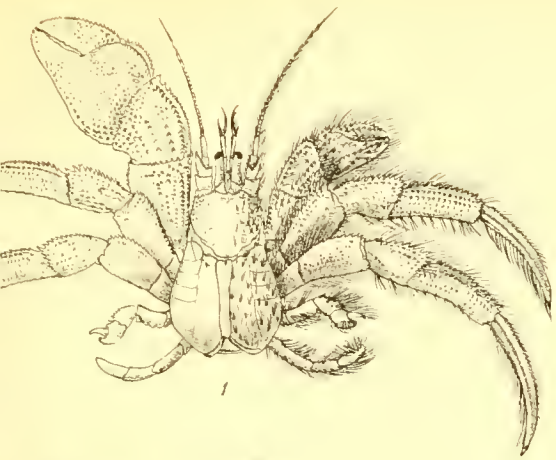
„ 8. Diogenes rectimanus: × 2

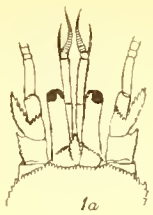
„ 8*a*. „ „ × 4

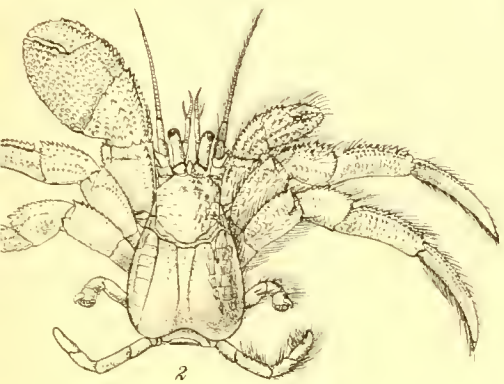
„ 9. Diogenes investigatoris: × 2

„ 9*a*. „ „ × 4

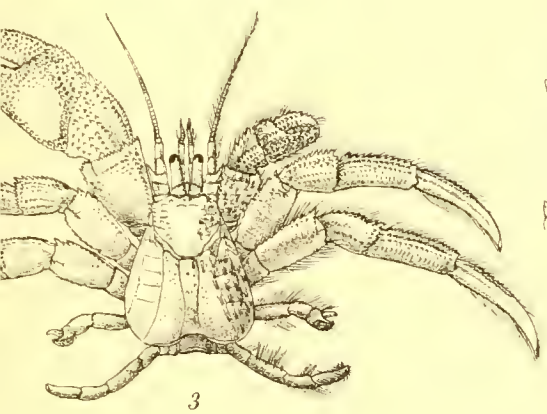
„ 9*b*. „ „ left hand: × 4


1


1a


2

2a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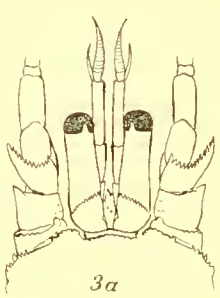
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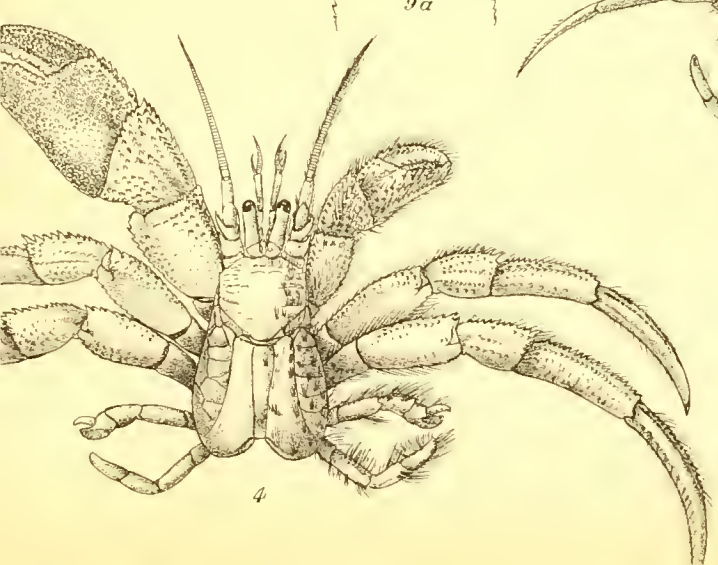
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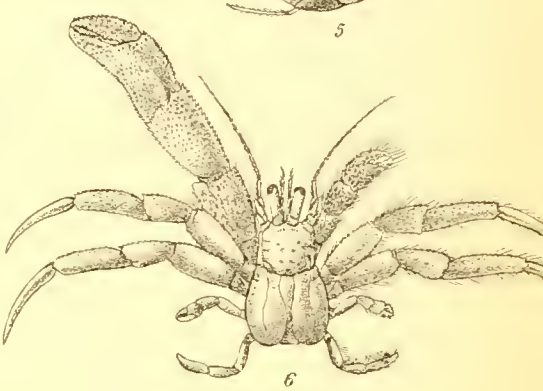
5

5a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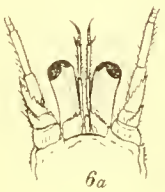
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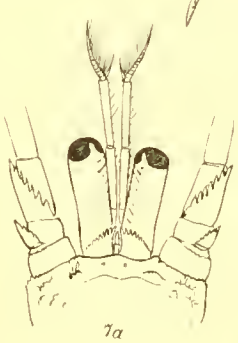
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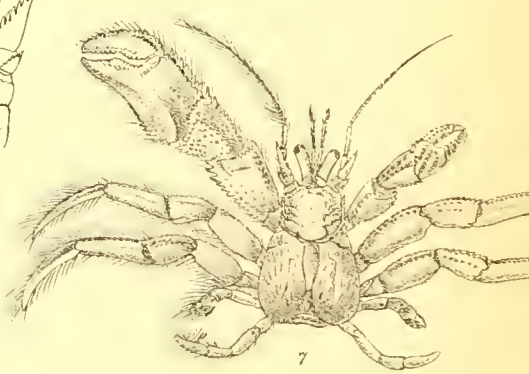
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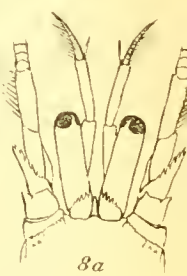
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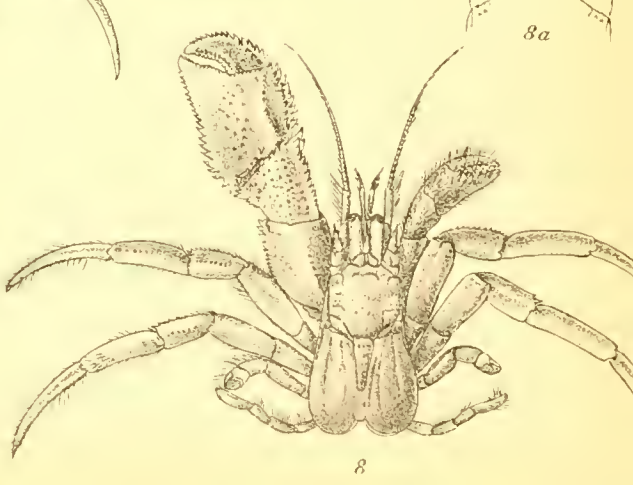
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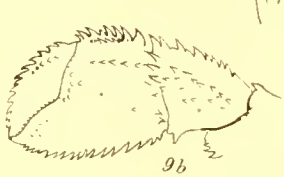
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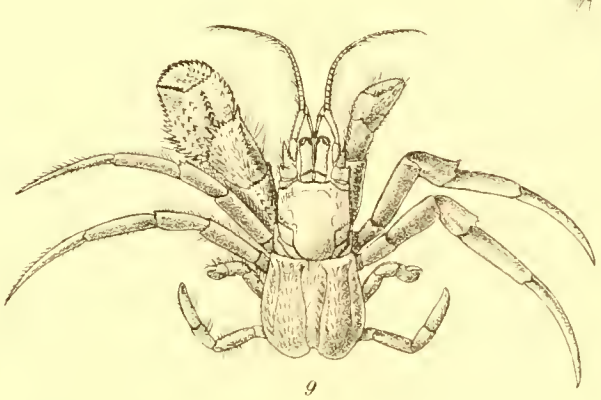
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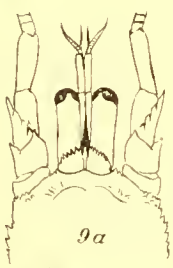
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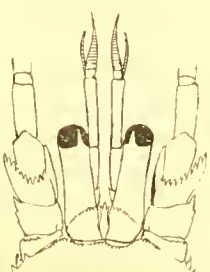

1a

EXPLANATION OF PLATE VII

Fig. 1. Diogenes bicristimanus : x 5

„ 1*a*. „ „ x 8

„ 2. Diogenes rectimanus : x 2

„ 2*a*. „ „ x 4

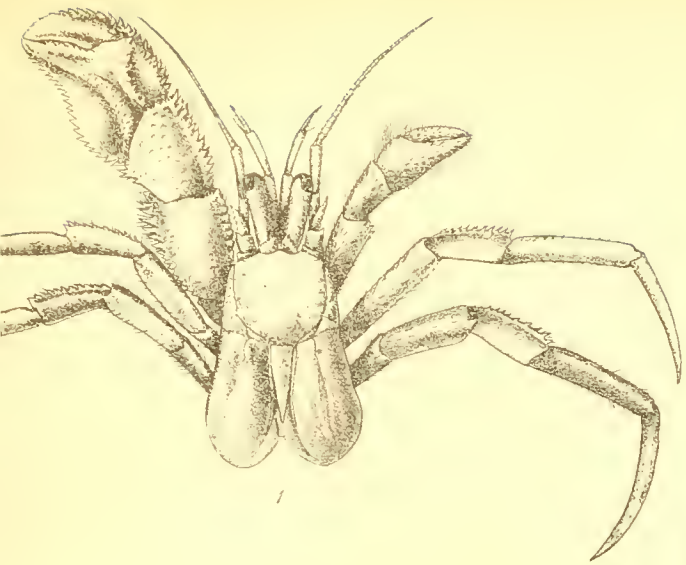
„ 3. Diogenes Gardineri : x 6

„ 3*a*. „ „ x 10

„ 4. Aniculus strigatus : x 2

„ 5. Aniculus tenebrarum : x 3

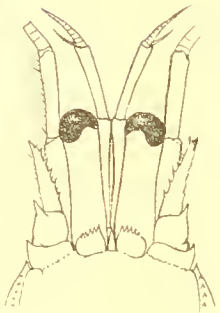
„ 6. Aniculus aniculus : natural size.



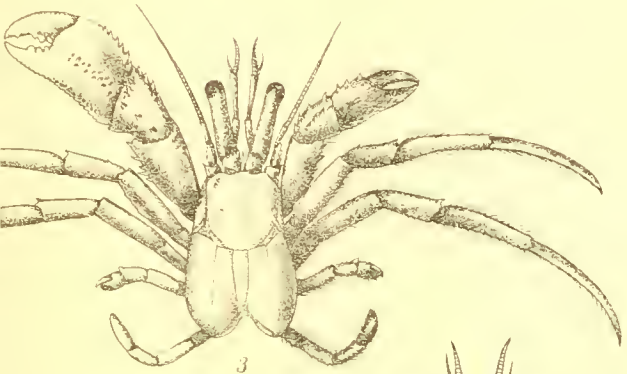
1

2a

2



1a



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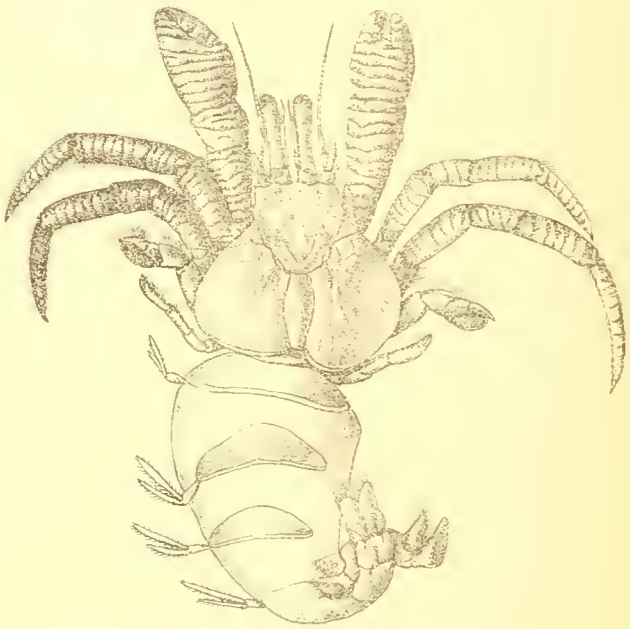

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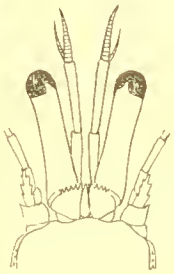
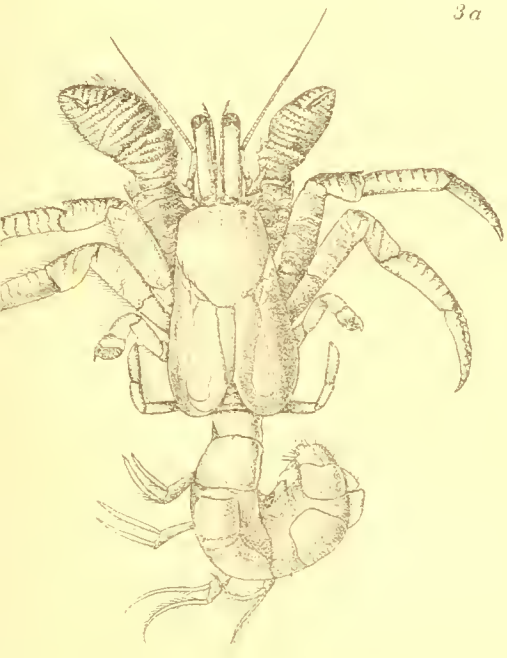


3a



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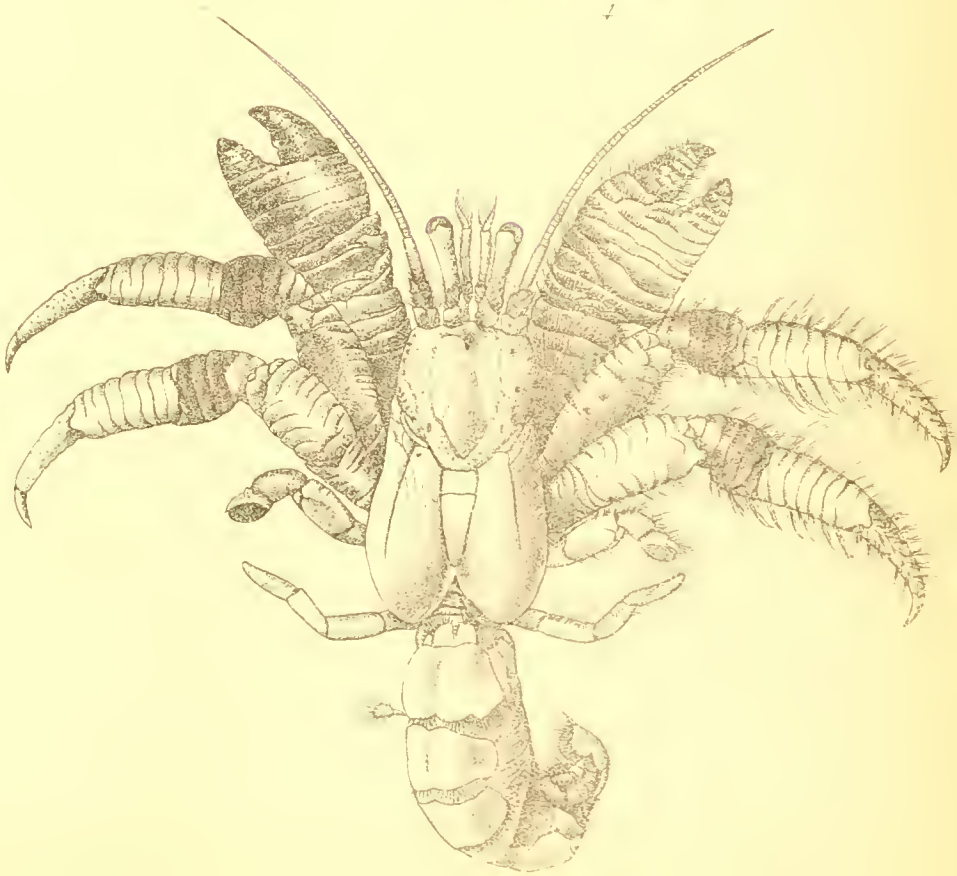


EXPLANATION OF PLATE VIII

Fig. 1. Pagurus punctulatus : natural size.

,, 1*a*. ,, ,, mouth-parts.

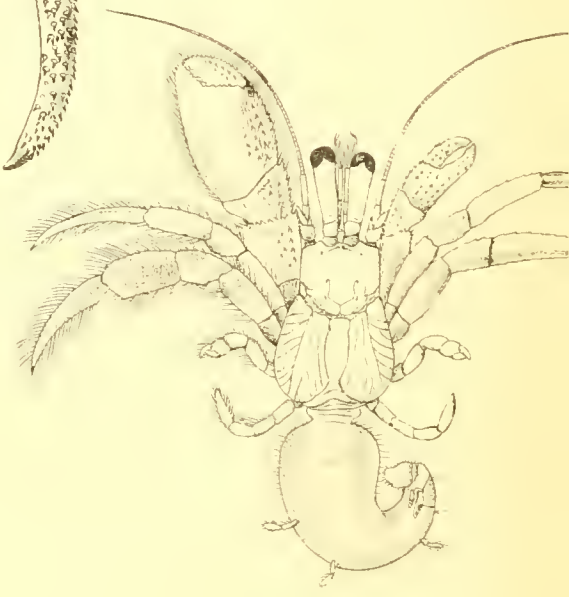
,, 2. Pagurus fabimanus : x $2\frac{1}{2}$

,, 3. Pagurus setifer : natural size.

,, 4. Pagurus hessii : natural size.

1

1a



2

EXPLANATION OF PLATE IX

Fig. 1. Pagurus guttatus; natural size.

,, 2. Pagurus euopsis: natural size.

,, 3. Pagurus Wood-Masoni: x $1\frac{1}{2}$

,, 4. Pagurus deformis: natural size.

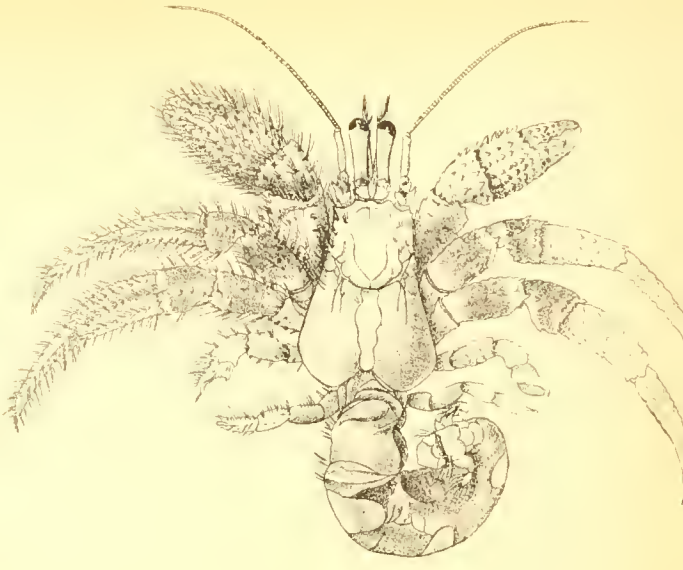
,, 5. Pagurus asper: x $1\frac{1}{2}$

,, 6. Pagurus dearmatus: x 2

,, 7. Pagurus varipes: natural size.

,, 8. Pagurus imbricatus; x 2

1



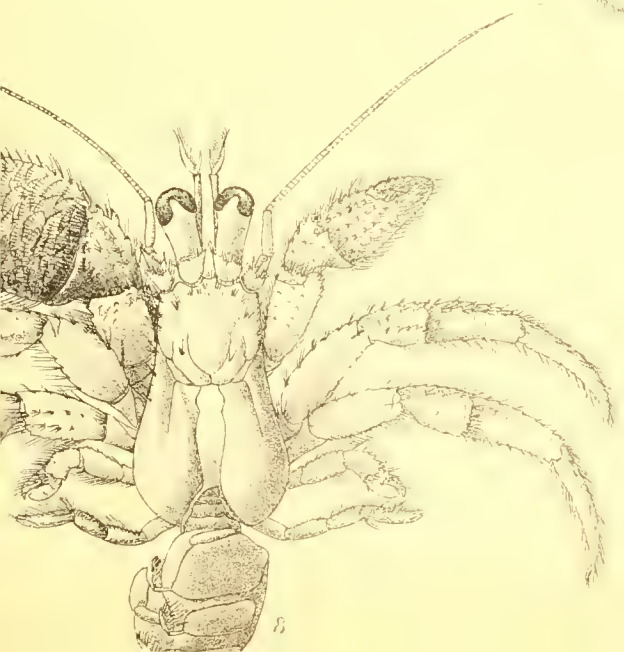
2

5

3

4

6



8

EXPLANATION OF PLATE X

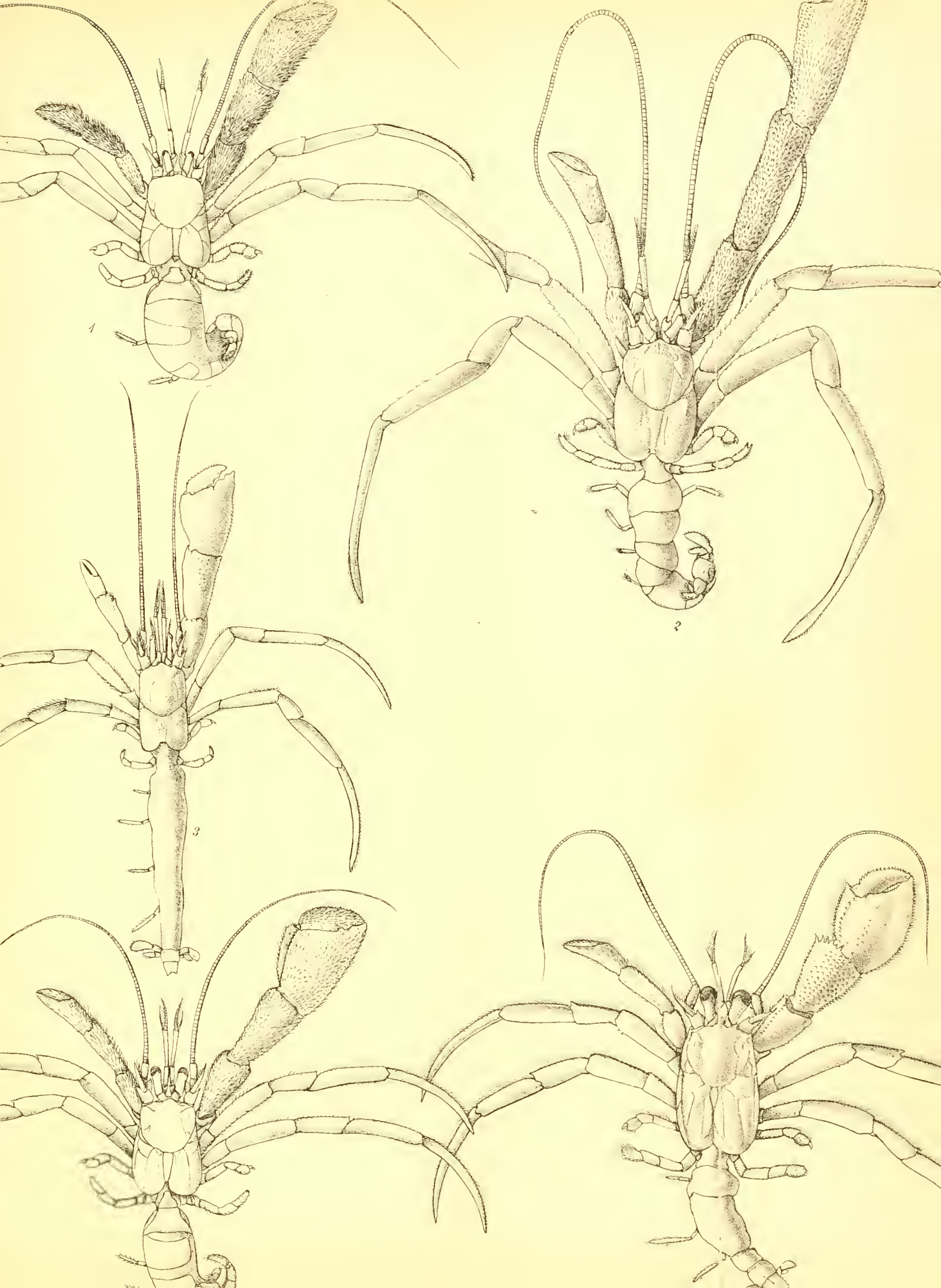
Fig. 1. Parapagurus pilosimanus: natural size.

„ 2. Parapagurus Andersoni: × 2

„ 3. Parapagurus minutus: × 4

„ 4. Sympagurus bicristatus *var.* indicus: × 3

„ 5. Sympagurus arcuatus *var.* monstrosus: × 3


1
2
3

EXPLANATION OF PLATE XI

Fig. 1. Eupagurus pergranulatus: x 3

„ 2. Eupagurus investigatoris: x 2

„ 3. Eupagurus Macardlei: x 1½

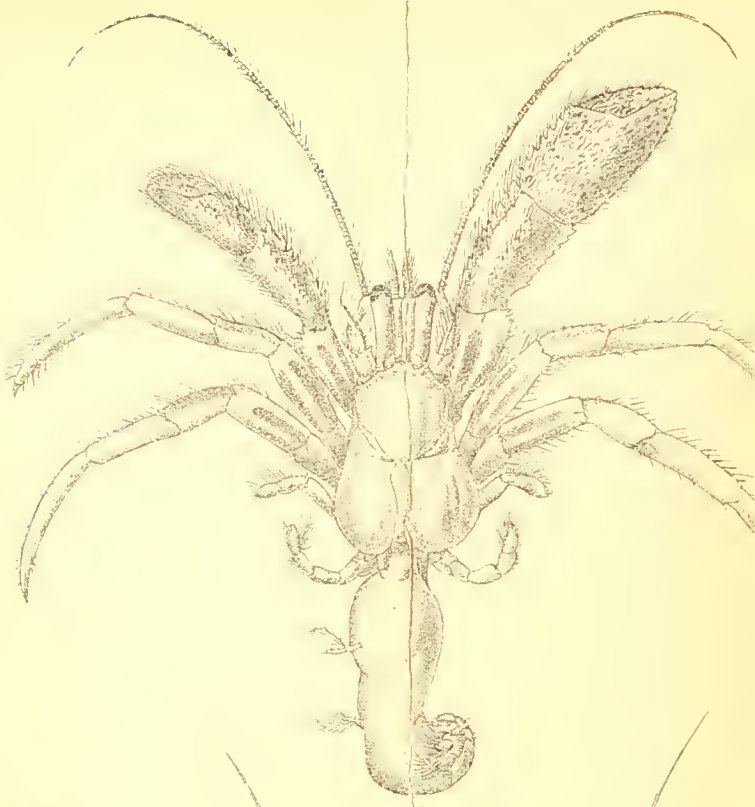
„ 4. Eupagurus carpoforaminatus *var.* nephromma: x 2

„ 4*a*. Eupagurus carpoforaminatus *var.* nephromma: ventral view of chelipeds: x 2

„ 5. Eupagurus zebra: x 2½

„ 6. Eupagurus janitor: x 2

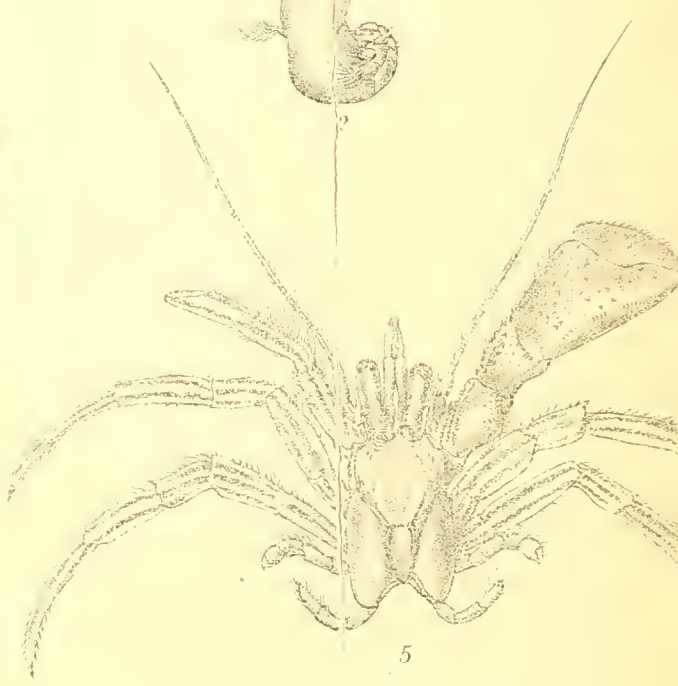
1



2

3

3a



5

4

6

EXPLANATION OF PLATE XII

Fig. 1. Nematopagurus squamichelis : x 1½

„ 1*a*. Nematopagurus squamichelis : last pair of thoracic and first pair of abdominal appendages of female : x 4

„ 2. Nematopagurus Gardineri : x 6

„ 3. Nematopagurus scutellichelis : x 3

„ 3*a*. Nematopagurus scutellichelis ; last pair of thoracic legs of male : x 5

„ 4. Nematopagurus indicus : x 2

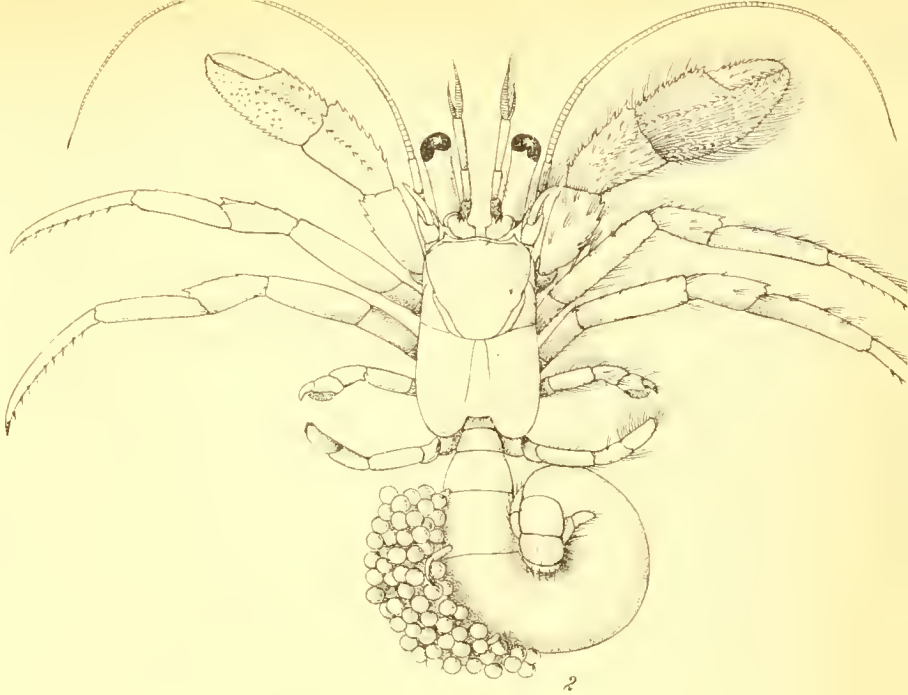
„ 5. Nematopagurus muricatus : x 5

„ 5*a*. Nematopagurus muricatus : last pair of thoracic legs of male : x 5

„ 6. Pagurodes limatulus ; x 2½

1

1a



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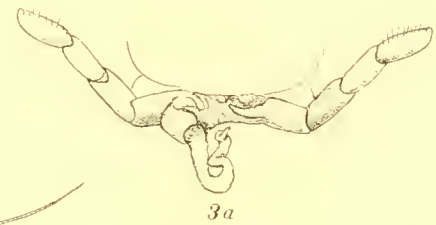
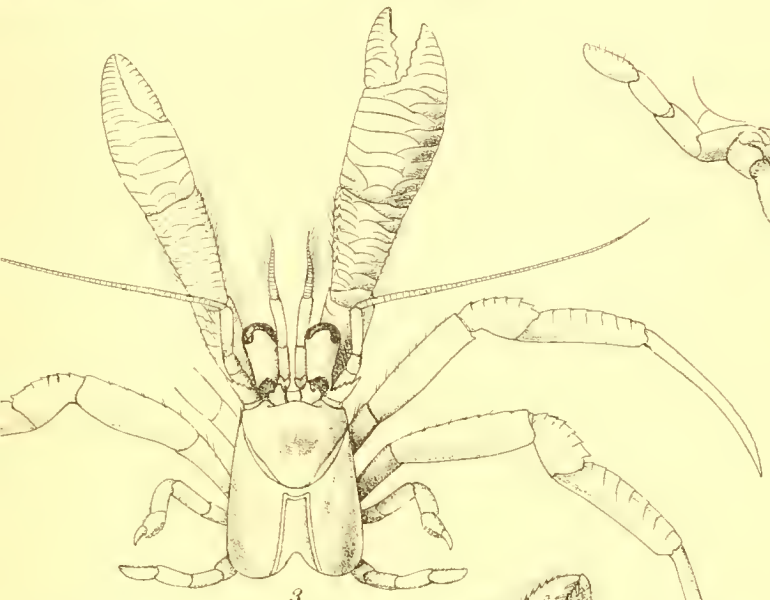


3a



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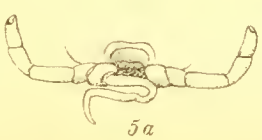
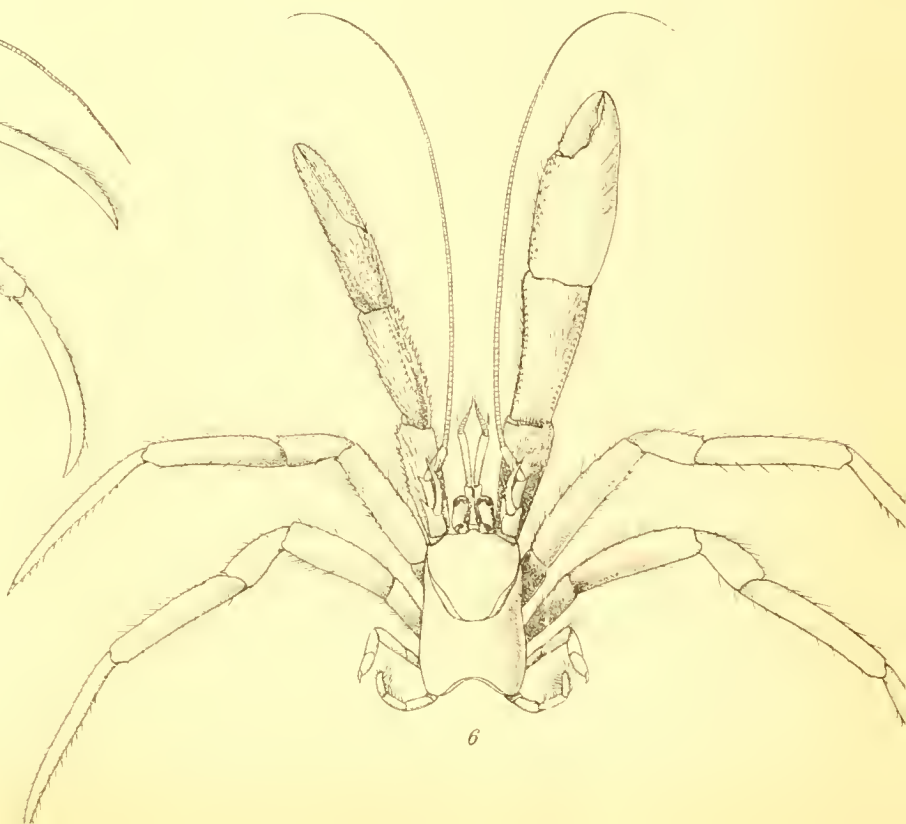
4

5



5a



6

EXPLANATION OF PLATE XIII

Fig. 1. Spiropagurus spiriger, male : x 1½

,, 1*a*. ,, ,, ventral surface : x 1½

,, 2. Pylopaguropsis magnimanis : x 1½

,, 2*a*. ,, ,, ventral surface of female : x 4

,, 3. Catapagurus ensifer, male : x 5

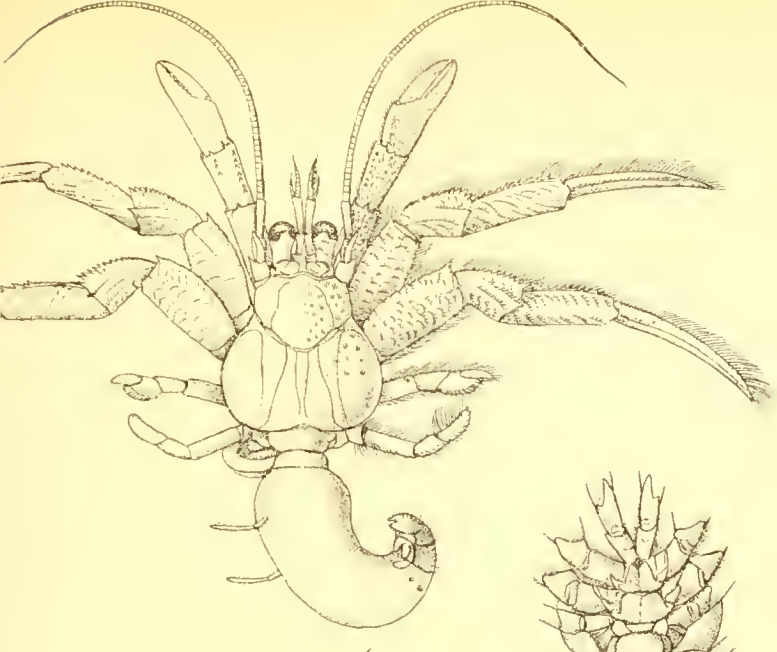
,, 4. Tomopaguropsis lanata, female : x 1½

,, 4*a*. ,, ,, ,, ventral surface : x 4

,, 5. Spiropagurus spiriger *var.* profundorum ; x 2

,, 6. Spiropagurus spiriger *var.* spinosicarpis : x 2

,, 7. Spiropagurus spiriger *var.* lophomeris : 3rd right leg : x 2



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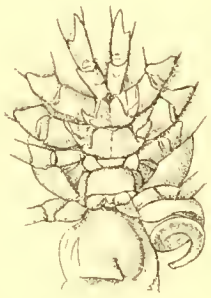
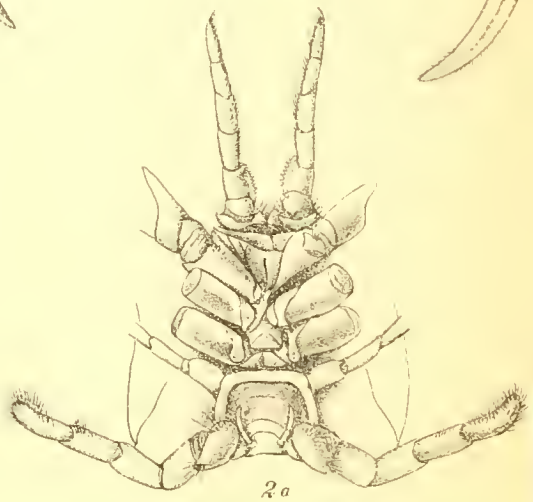
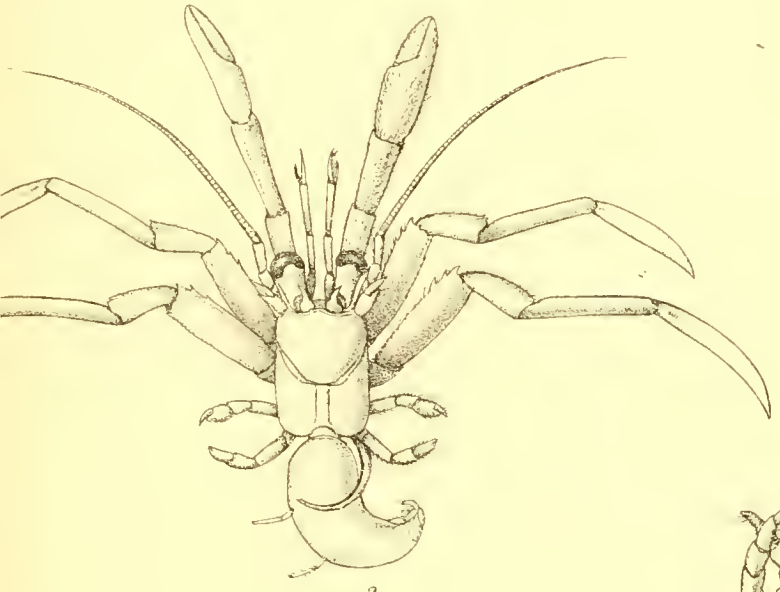


1a

2



2a



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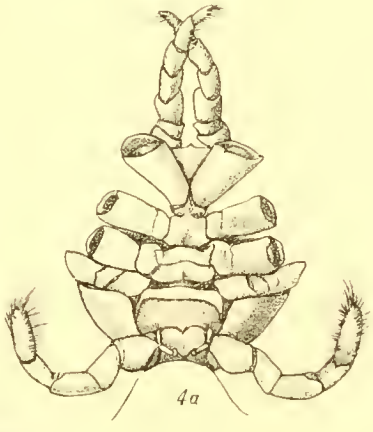
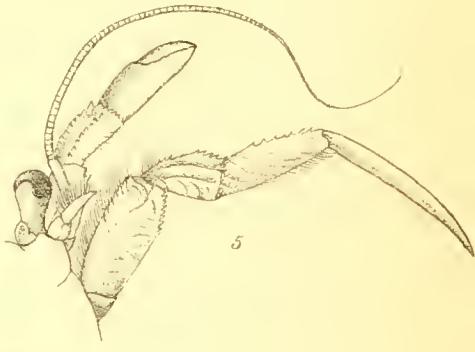


4a



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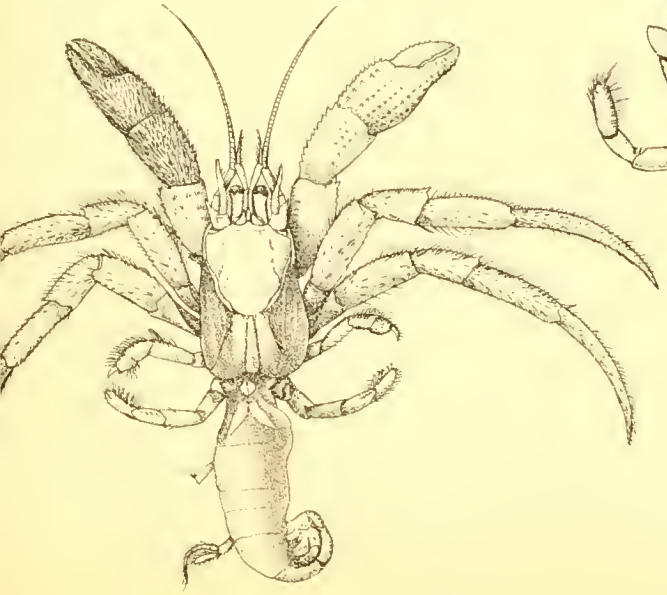

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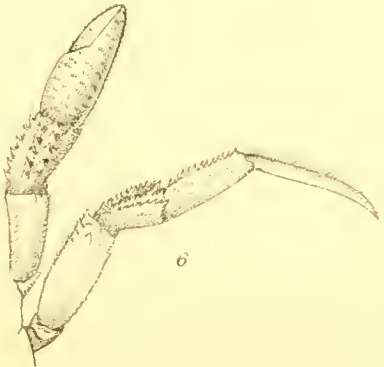


6

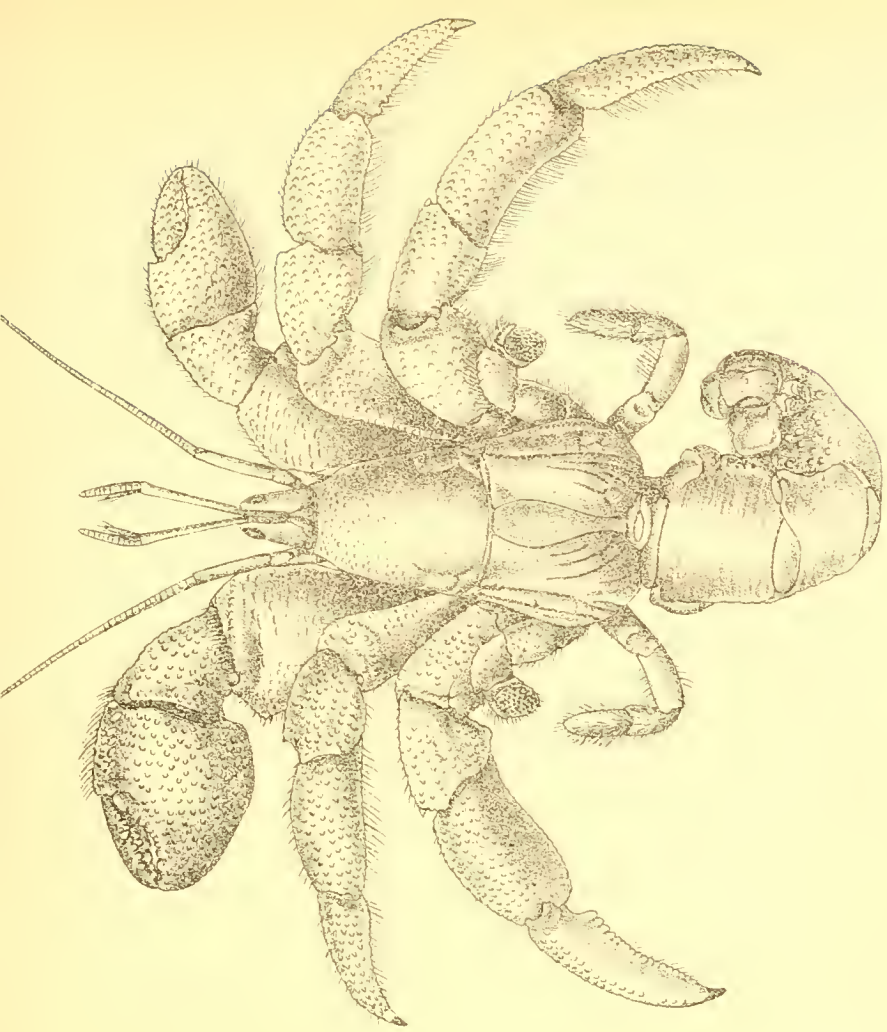
7

EXPLANATION OF PLATE XIV

Fig. 1. Coenobita cavipes : × 1½

„ 2, 2*a*. Coenobita perlatus : × 1½

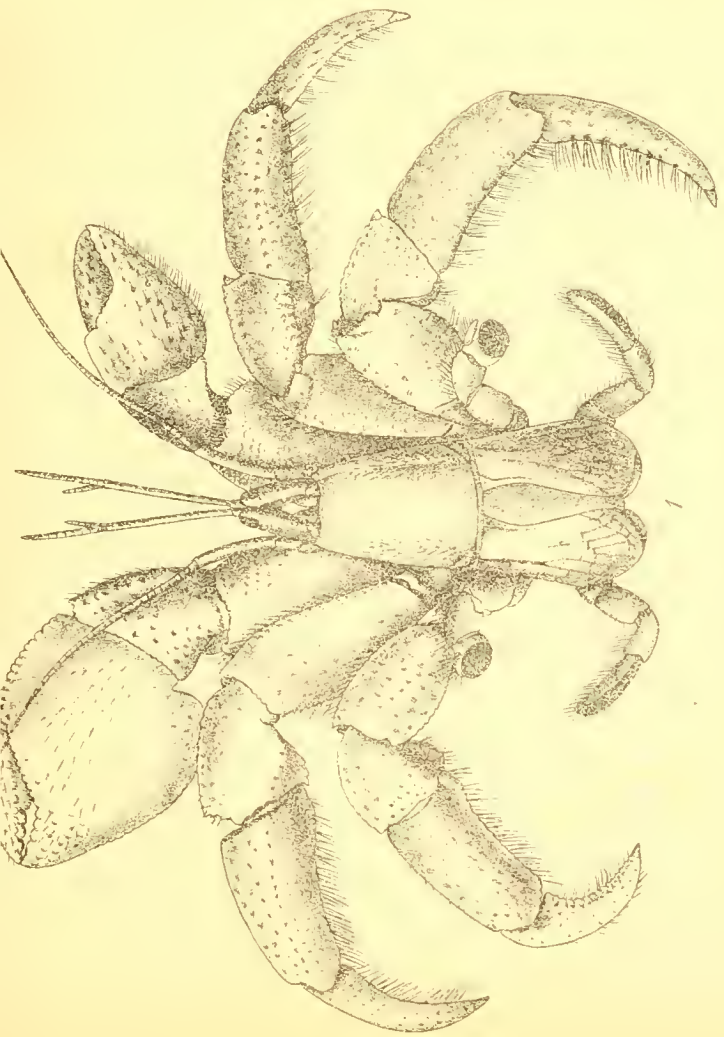
„ 3, 3*a*. Coenobita rugosus ; × 2



2

2a

3a



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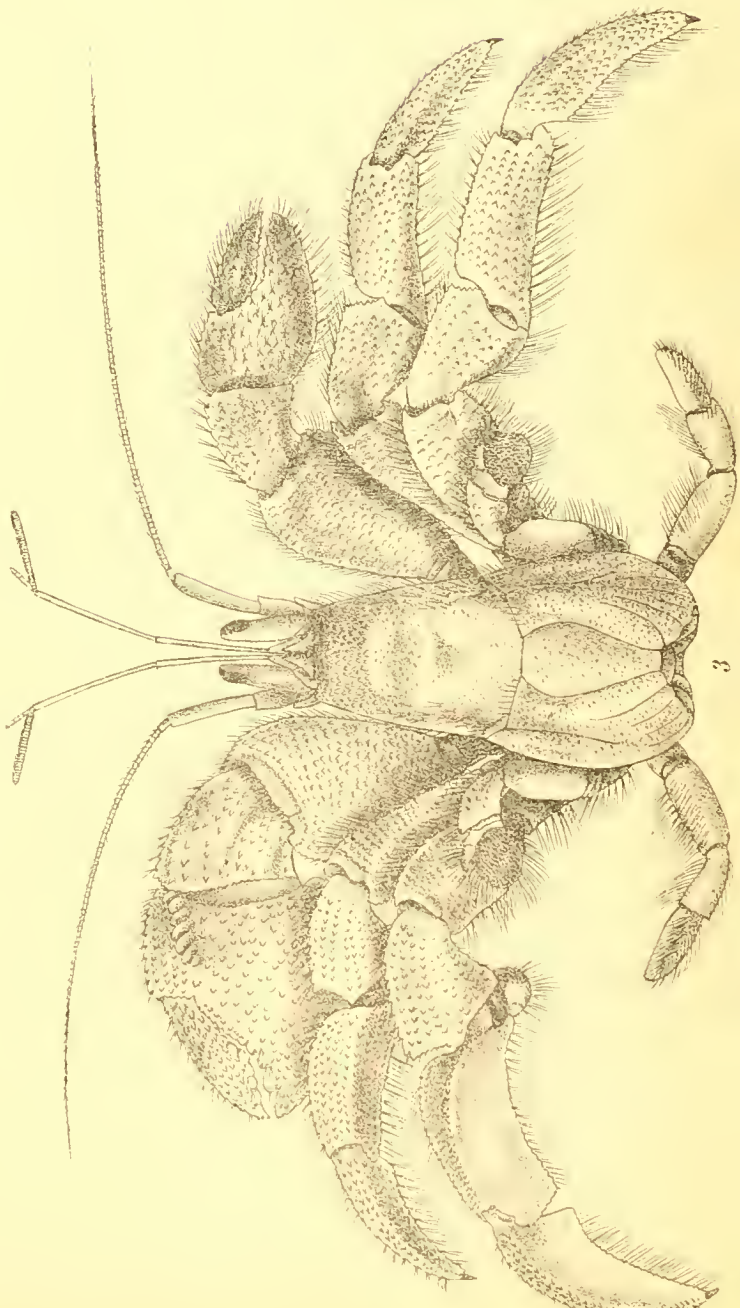


3

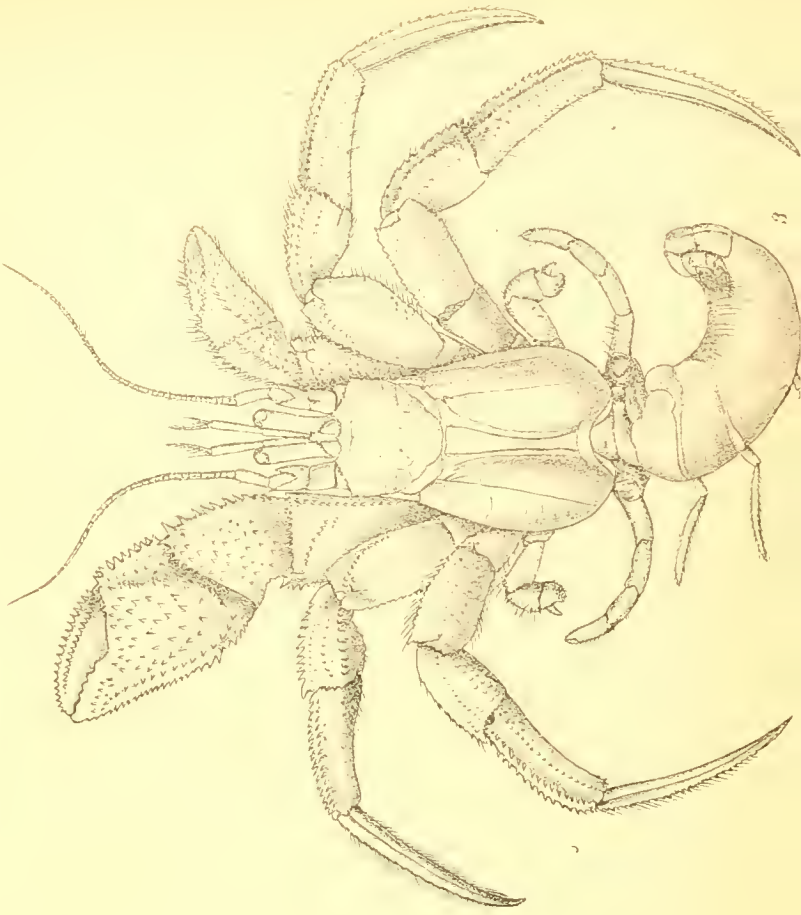
EXPLANATION OF PLATE XV

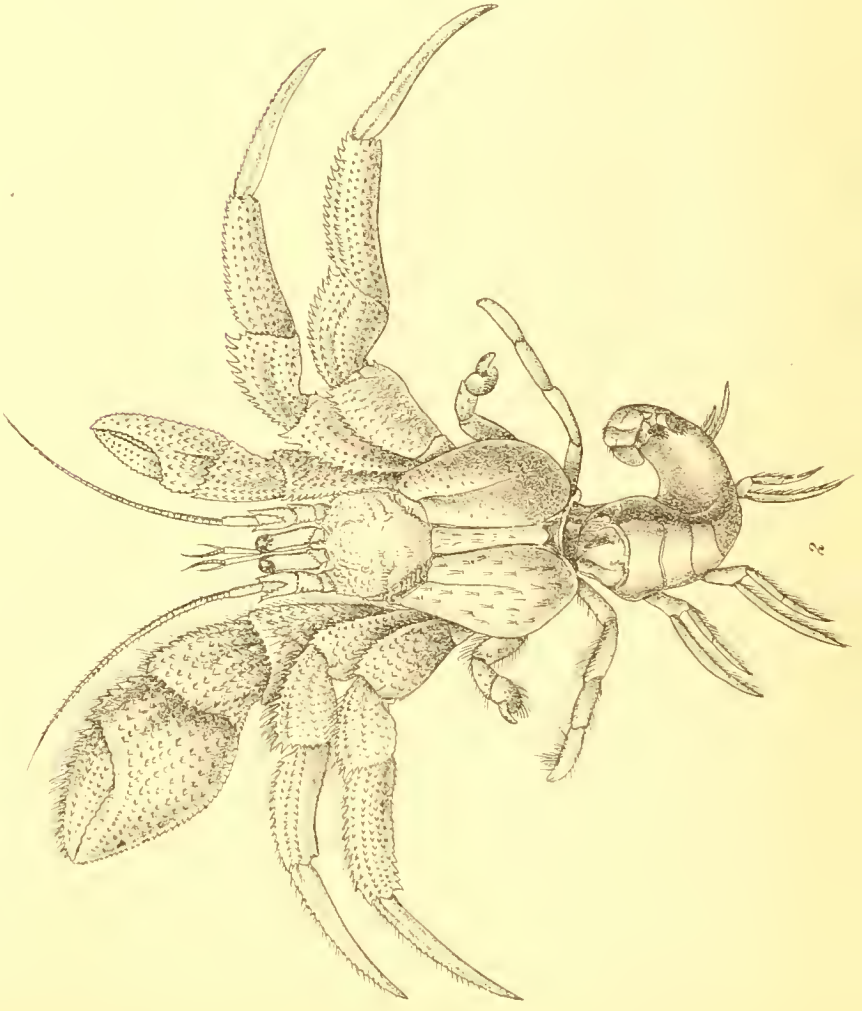
Fig. 1, 1*a*. Coenobita clypeatus : natural size.

„ 2. Diogenes merguiensis : × 1½

„ 2*a*. „ „ tubercles of cheliped : × 6

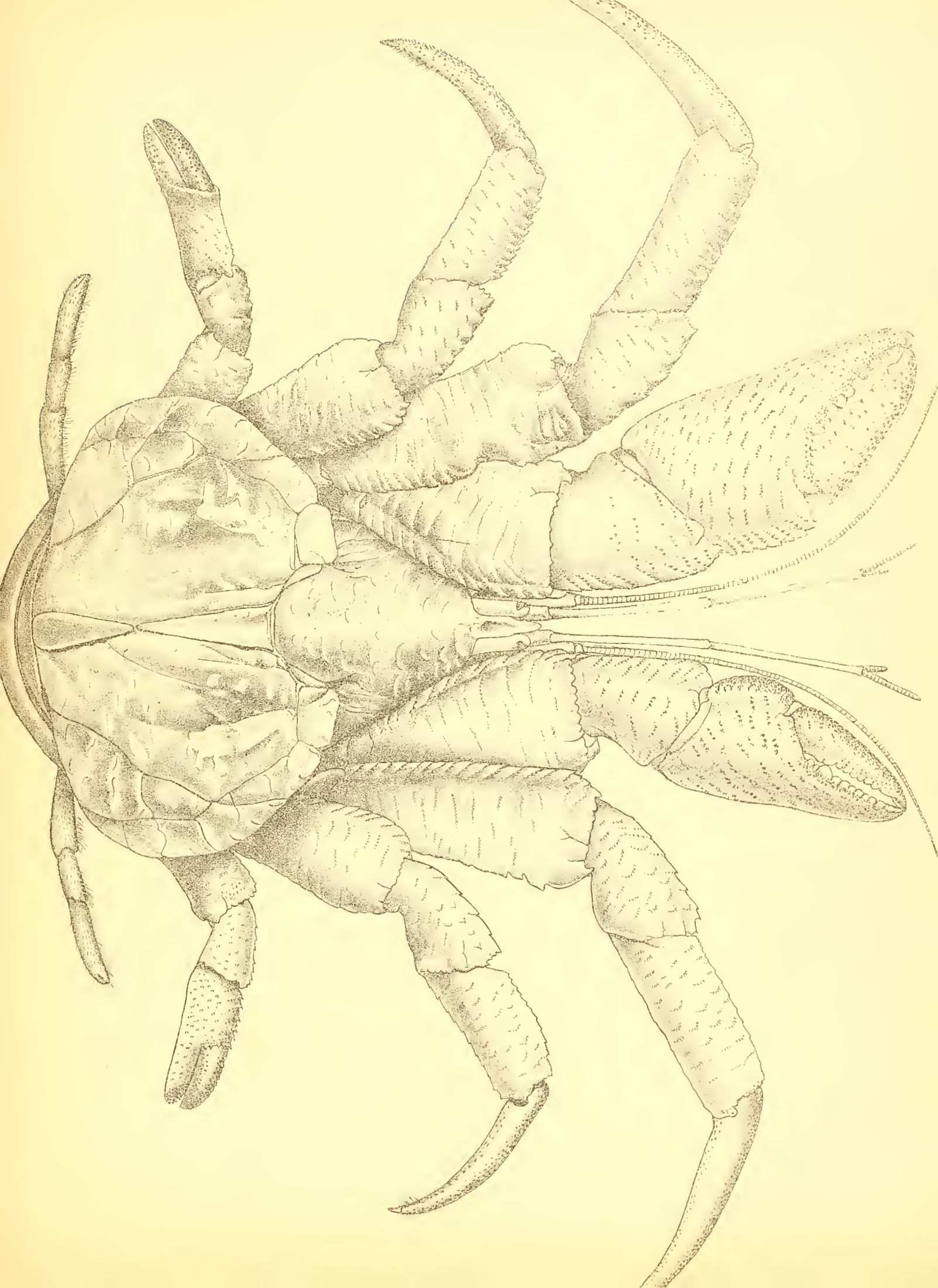
„ 3. Diogenes diogenes : × 1½

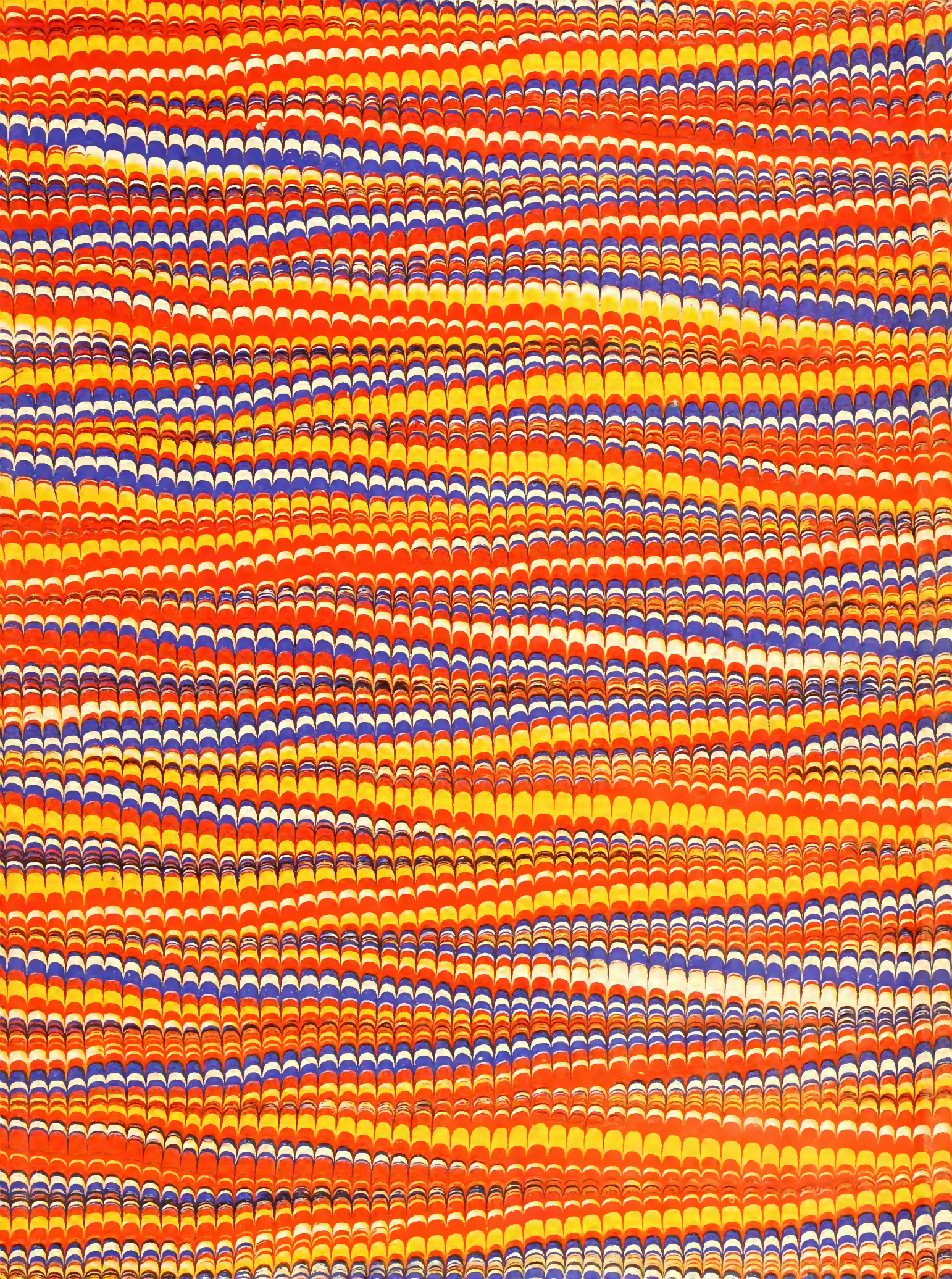




EXPLANATION OF PLATE XVI

Fig. 1. Birgus latro, male; two-thirds natural size.





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